SHARP OPTONICA

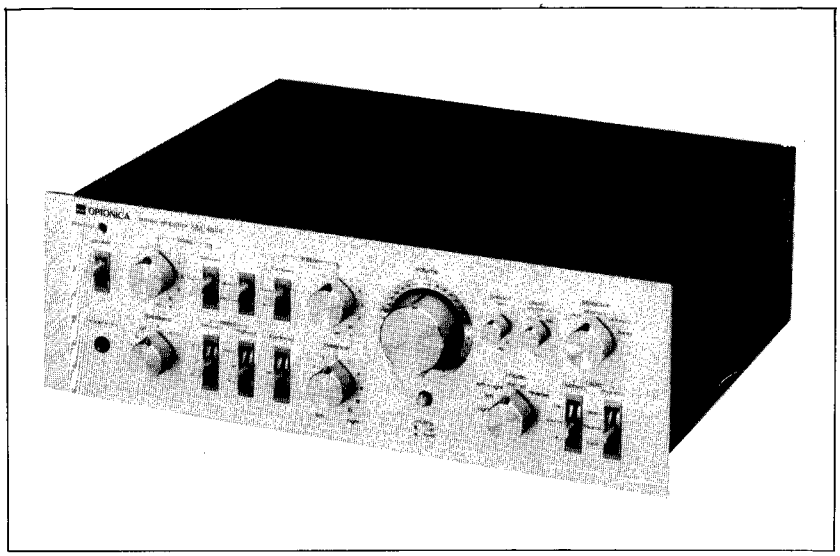
SERVICE MANUAL

SM-4646H
SM-4646HB

STEREO PRE/MAIN-AMPLIFIER

MODEL

SM-4646H
(Silver Panel)
SM-4646HB
(Black Panel)



In the interests of user-safety the set should be restored to its original condition and only parts identical to those specified be used.

CAUTIONS:
In the case of this model SM-4646H/HB, since the power supply voltage and current capacity are relatively high, the potential remains at it is without decreasing in about 20minutes even after the power switch is turned off. When handling or repairing this set, pay due attention to this regard.

SPECIFICATIONS

GENERAL DESCRIPTION

Power source: a.c. 110/220/240 V, 50/60 Hz
Power consumption: 520 W
Semiconductors: 2-IC (Integrated circuit)
39-Transistor
8-FET
25-Diode
1-LED
Dimensions: Width: 442 mm
Height: 144 mm
Depth: 363 mm
Weight: 16 kg

MAIN AMPLIFIER

Circuit: Differential amplifier, complementary system, OCL (Output Capacitor-Less)
Continuous power output:
2 x 95 W/4 ohms, Both channels driven at 1 kHz, 0.05% distortion
2 x 70 W/8 ohms, Both channels driven at 1 kHz, 0.05% distortion
2 x 85 W/4 ohms, Both channels driven at 20 Hz ~ 20 kHz, 0.05% distortion
2 x 60 W/8 ohms, Both channels driven at 20 Hz ~ 20 kHz, 0.05% distortion
Intermodulation distortion: 0.05% at 95W
Damping factor: more than 50 (at 1 kHz, 8 ohms)
Power bandwidth: 5 Hz ~ 40 kHz at 0.1% distortion, 47.5 W
Input sensitivity and input impedance: 650 mV/50k ohms

PRE-AMPLIFIER

Equalizer amplifier:
FET-Differential amplifier, ICL (Input Capacitor-Less), dual power supply (plus and minus)
Tone control:
FET-Differential amplifier, ICL, Dual power supply (plus and minus), 'NF' type
Input sensitivity and input impedance:
PHONO 1: 2.5 mV
22k ohms, 47k ohms, 100k ohms
PHONO 2: 2.5 mV ~ 5 mV/47k ohms
AUX: 150 mV/47k ohms
TUNER: 150 mV/47k ohms
TAPE PB 1 and 2: 150 mV/47k ohms
TAPE PB (DIN socket) 1 and 2: 150 mV/47k ohms
Output level and load impedance:
REC 1 and 2: 150 mV/47k ohms
REC 1 and 2 (DIN socket) 30 mV/82k ohms
Phono overload: 350 mV (RMS, 1 kHz)
RIAA curve deviation: ± 0.3 dB (20 Hz ~ 20 kHz)
Frequency response: 5 Hz ~ 70 kHz ± 1.5 dB (TUNER, AUX, TAPE PB)
Signal to noise ratio:
PHONO 1 and 2: 70 dB
AUX, TUNER, TAPE PB: 90 dB
Tone control:
Bass: ± 10 dB (at 100 Hz, turnover 600 Hz)
± 10 dB (at 50 Hz, turnover 300 Hz)
Treble: ± 10 dB (at 10 kHz, turnover 1.5 kHz)
± 10 dB (at 20 kHz, turnover 3 kHz)
Low cut filter: −3 dB at 30 Hz, 12 dB/oct.
−3 dB at 10 Hz, 12 dB/oct.
High cut filter: −3 dB at 7 kHz, 6 dB/oct.
−3 dB at 20 kHz, 6 dB/oct.
Audio muting: −20 dB

Specifications of this model are subject to change without prior notice.

SHARP CORPORATION OSAKA, JAPAN

LAYOUT OF FRONT PARTS

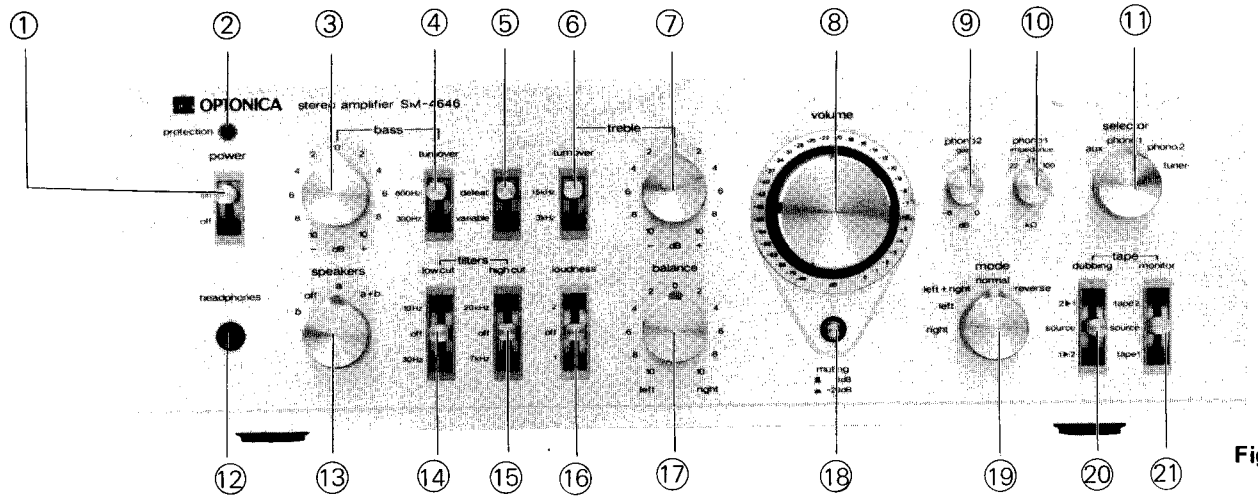


Figure 1

① Power switch
② Power source/circuit protection indicator
③ Bass control
④ Turnover frequency selector for bass control
⑤ Tone control defeat switch
⑥ Turnover frequency selector for treble control
⑦ Treble control
⑧ Volume control
⑨ Input level control (for phono 2)
⑩ Input impedance selector (for phono 1)
⑪ Function selector
⑫ Headphones jack
⑬ Speakers selector
⑭ Low cut filter switch
⑮ High cut filter switch
⑯ Loudness switch
⑰ Balance control
⑱ Muting switch
⑲ Mode selector
⑳ Tape dubbing switch
㉑ Tape monitor switch

LAYOUT OF REAR PARTS

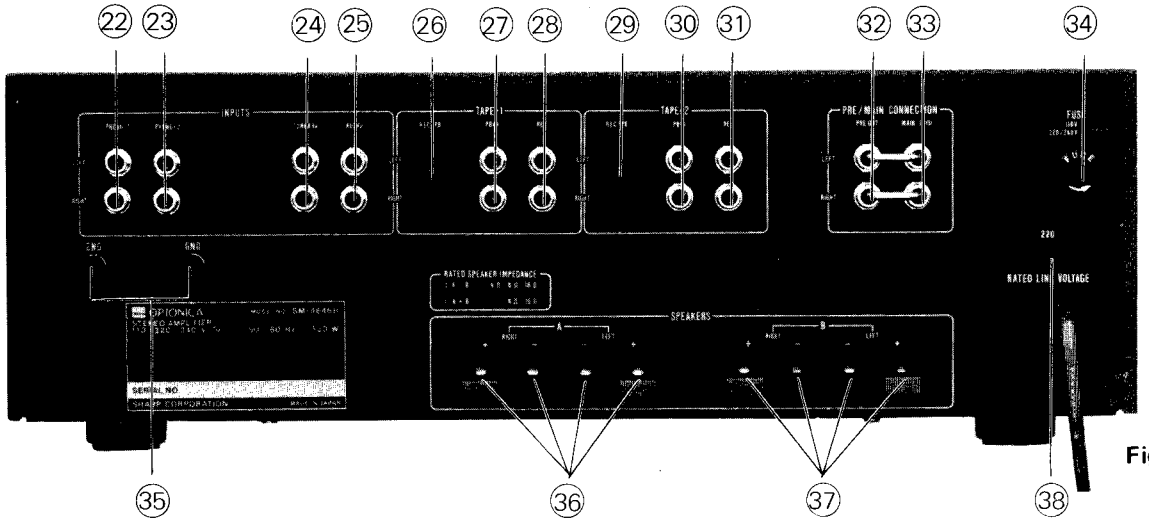


Figure 2

㉒ Phono input jacks 1
㉓ Phono input jacks 2
㉔ Tuner input jacks
㉕ Auxiliary input jacks
㉖ Record/playback socket 1
㉗ Tape playback jacks 1
㉘ Recording output jacks 1
㉙ Record/playback socket 2
㉚ Tape playback jacks 2
㉛ Recording output jacks 2
㉜ Output jacks of pre-amplifier
㉝ Input jacks for main-amplifier
㉞ Fuse holder
㉟ Earth terminals
㊱ Speaker terminals-A
㊲ Speaker terminals-B
㊳ Mains voltage selector

VOLTAGE SELECTION (Refer to Figure 3)
Check the preset voltage before connecting the mains plug to a mains wall outlet. If the setting is different from your local supply mains voltage, the selector must be re-set as follows. Rotate the voltage selector by using a screwdriver so that your local voltage number can be seen.

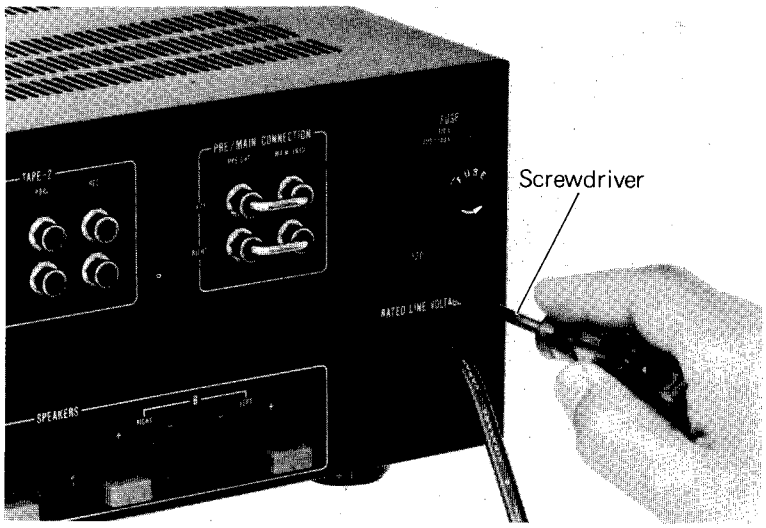


Figure 3

NOTE FOR USERS IN AUSTRALIA
For your safety
To ensure safe operation the three-pin plug supplied must be inserted only into a standard three-pin power point which is effectively earthed through the normal household wiring. The fact that the equipment operates satisfactorily does not imply that the power point is earthed and that the installation is completely safe. For your safety, if in any doubt about the effective earthing of the power point, consult a licensed electrician.
Extension cords used with the equipment must also be correctly wired to provide connection to earth. Wrongly wired extension cords are a major cause of fatalities.

DISASSEMBLY (Refer to Figure 4)

Prior to removing the cabinet, be sure to draw the power supply plug from an wall outlet and disconnect all of connection cords at the rear of the set.

1. To remove the cabinet:
   Remove 10 screws retaining the cabinet (5 screws for each the right and left side), then the cabinet can be detached by holding it up.
2. To remove the bottom board:
   Turn over the set and remove 16 screws retaining the bottom board, then the bottom board can be detached by holding it up.
3. To remove the front panel:
   Pull out 18 knobs (for the power switch/bass control/bass turnover frequency selector/tone control defeat switch/treble turnover frequency selector/treble control/volume control/PHONO 2 input level control/PHONO 1 input impedance selector/function selector/tape monitor switch/tape dubbing switch/mode selector/balance control/loudness switch/high cut filter switch/low cut filter switch/speaker selector) from the front panel, remove 6 screws retaining the front panel (3 screws for each the upper and lower part), then the front cabinet can be detached by pulling it toward you.

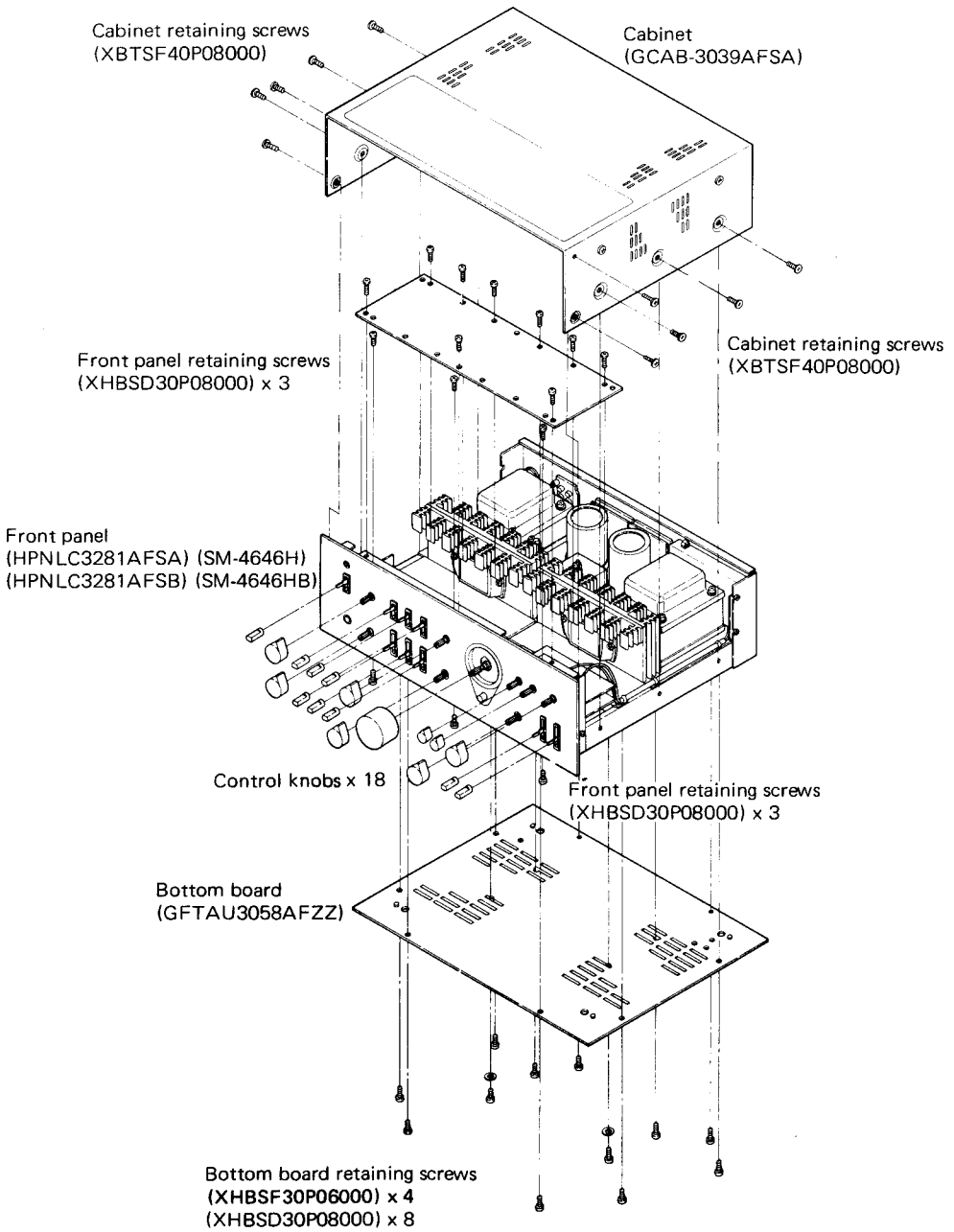


Figure 4

CIRCUIT DESCRIPTION

EQUALIZER CIRCUIT (Refer to Figures 5, 6 and 7)

This equalizer circuit is powered by balanced power supply of +43V and −43V and the potentials at the input and output sections are both kept to 0V.

Coming from the phono input jack, signals are applied, through the function selector switch (SW101) and resistor (R111 or R112), to the differential amplifier (Q101 and Q103 or Q102 and Q104) which are all FET (Field Effect Transistor) to be amplified. This amplifier serves to make DC potential at the output section be kept to 0V as well as to carry out the amplification of signals. The signals thus output from the differential amplifier are further amplified by the common-emitter amplifier made of the transistor (Q109 or Q110) and the SEPP (Single Ended Push-Pull) amplifier comprising the transistors (Q115 and Q117 or Q116 and Q118) so that they will enter the function selector switch (SW101) through the coupling capacitor (C119 or C120) and the resistor (R149 or R150). As for signals coming from the phono input jack 2, they enter the function selector switch through the PHONO 2 input level control (VR101). NF circuit aimed at obtaining RIAA equalizer curve characteristic is composed of such high-precision parts as resistors (R141 and R143 and R145, or R142 and R144 and R146) and capacitors (C113 and C115 and C117, or C114 and C116 and C118). The resistor (R123 or R124) is to decide feedback amount and besides determine the gain of equalizer amplifier in terms of the impedance ratio against RIAA equalizer element. The capacitor (C109 or C110) is time constant with respect to the resistor (R123 or R124), which determines the feedback amount about low-frequency band. If capacitance of this capacitor is lessened, the feedback amount of high-frequency band is increased. The transistor (Q105 or Q106) is to reduce to a specified operating value the voltage applied to the drain of FET (Q101 or Q102). In the combination between the FET (Q101 or Q102) and transistor (Q109 or Q110), since the base voltage of the transistor (Q109 or Q110) is lower than the power supply voltage of equalizer circuit, it is necessary to insert as bypass capacitor a high-value resistor and electrolytic capacitor into the emitter of the transistor (Q109 or Q110) so that there will be higher resistance in terms of DC while lower impedance in terms of AC.---the use of this bypass capacitor can, however, cause a phase shift in low frequency and also result in a decrease of tone quality.

For this reasoning, this set adopts the transistor (Q107 or Q108) in the place of such bypass capacitor so as to realize higher resistance in terms of DC and lower impedance in terms of AC, even without a tone quality decrease being accompanied. The transistor (Q111 or Q112) serves as a constant current load for the transistor (Q109 or Q110), which makes it needless to use electrolytic capacitor although its use has been required in the case of a conventional bootstrap circuit. Different from an usual one, this circuit is using no electrolytic capacitors except for that which is aimed at determination of the feedback amount of low-frequency band. The capacitors (C101, C102, C103, C104, C105 and C106) are for prevention of external noises while those (C107, C108, C121, C122, C127 and C128) for prevention of oscillations.

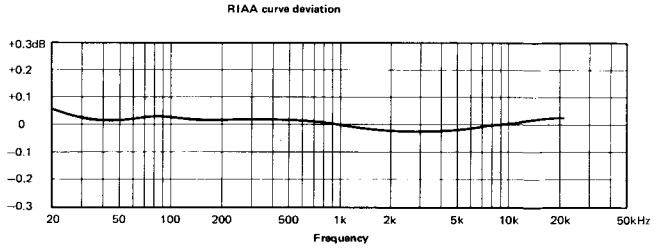


Figure 5

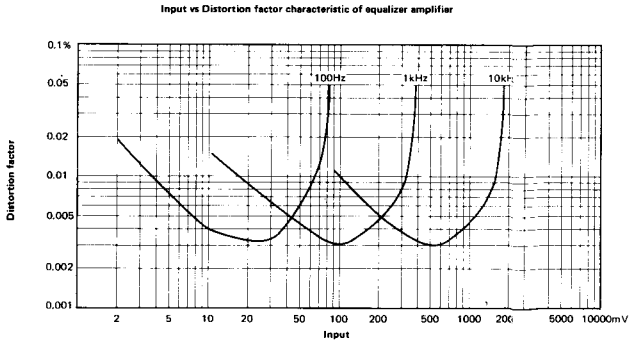


Figure 6

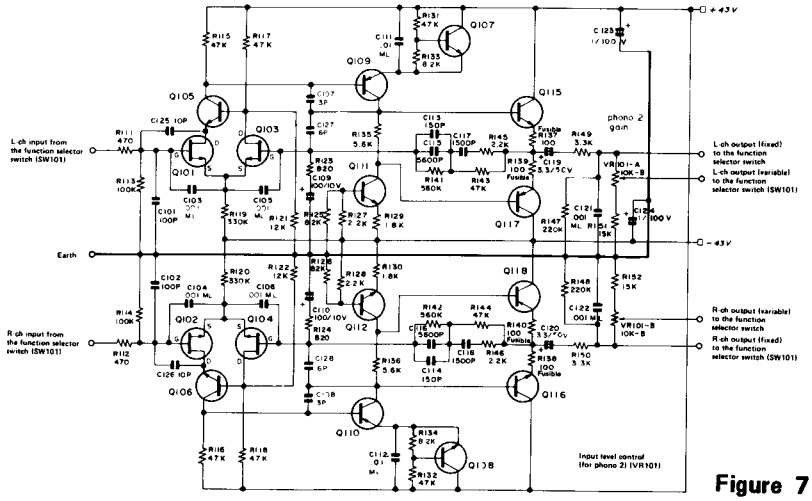


Figure 7

TONE CIRCUIT (Refer to Figures 8, 9 and 10)

Coming from the function selector switch (SW101), signals are once applied to the tape monitor switch (SW202), tape dubbing switch (SW201), mode selector switch (SW203), muting switch (SW204), balance control (VR201), loudness switch (SW205) and volume control (VR202), and then to the differential amplifier consisting of low-noise FET (Q201 and Q203 or Q202 and Q204) to be amplified. Signals thus output from the drain of the low-noise FET (Q201 or Q202) enter the base of transistor (Q205 or Q206). The transistor (Q205 or Q206) is a unique circuit: while the usual one is so designed that a resistor is inserted to the emitter of the transistor (Q205 or Q206) which is connected directly to the power source, this Sharp one has such a design that the emitter of transistor (Q205 or Q206) is connected to the drain of low-noise FET (Q203 or Q204), as a result of which distortions caused at the differential amplifier will be cancelled since the phase at the drain of FET (Q201 or Q202) will be reverse in phase to that at the drain of FET (Q203 or Q204)---too low a distortion factor is thus assured even with no feedback operation. Signals thus output from the collector of the transistor (Q205 or Q206) are applied, through the emitter follower amplifier (Q207 or Q208) and coupling capacitor (C215 or C216), to the filter circuit. A part of signals output from the coupling capacitor (C215 or C216) enter the gate of FET (Q203 or Q204) through the tone NF circuit. The tone NF circuit includes the bass control (VR203) to emphasize or attenuate the bass sound and the treble control (VR204) to do the same for the treble sound. Both the bass control (VR203) and treble control (VR204) are provided with 2dB-step detents. The turnover frequency selector switches (SW206 and SW208) are to select the turnover frequency 300Hz or 600Hz for the bass range, and 1.5kHz or 3kHz for the treble range. The tone control defeat switch (SW207) works to provide a specified feedback amount for the tone NF circuit by means of the resistors (R271 and R273 or R272 and R274) so that a flat frequency characteristic will be able to be obtained. The capacitors (C209, C210, C213, C214, C245 and C246) are for prevention of oscillation. The resistor (R249 or R250) and capacitor (C219 or C220) are to prevent the tone amplifier from getting unstabilized in the treble range.

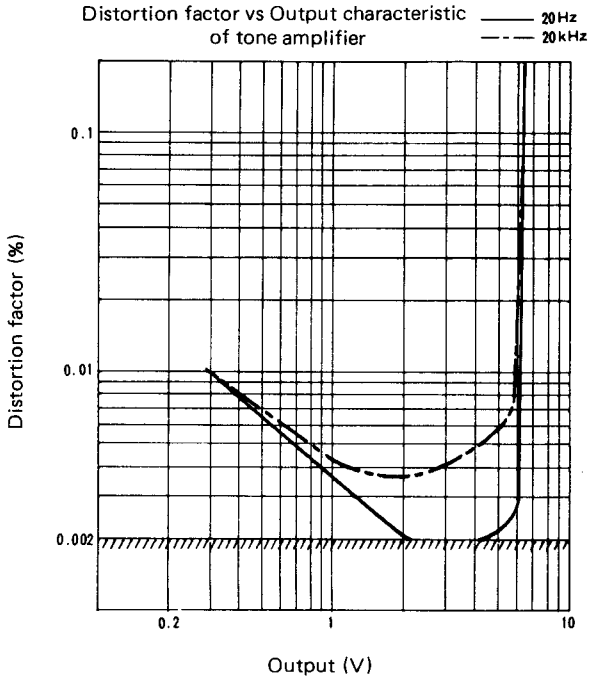


Figure 8

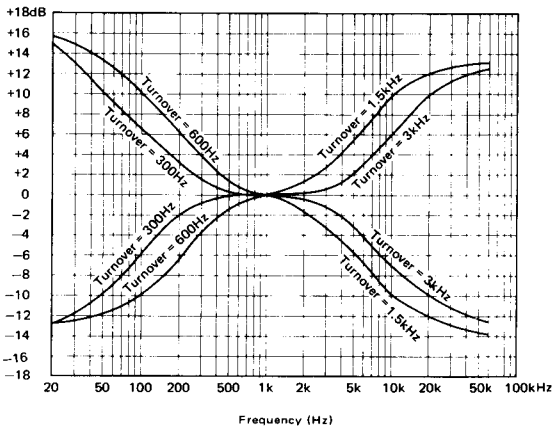


Figure 9

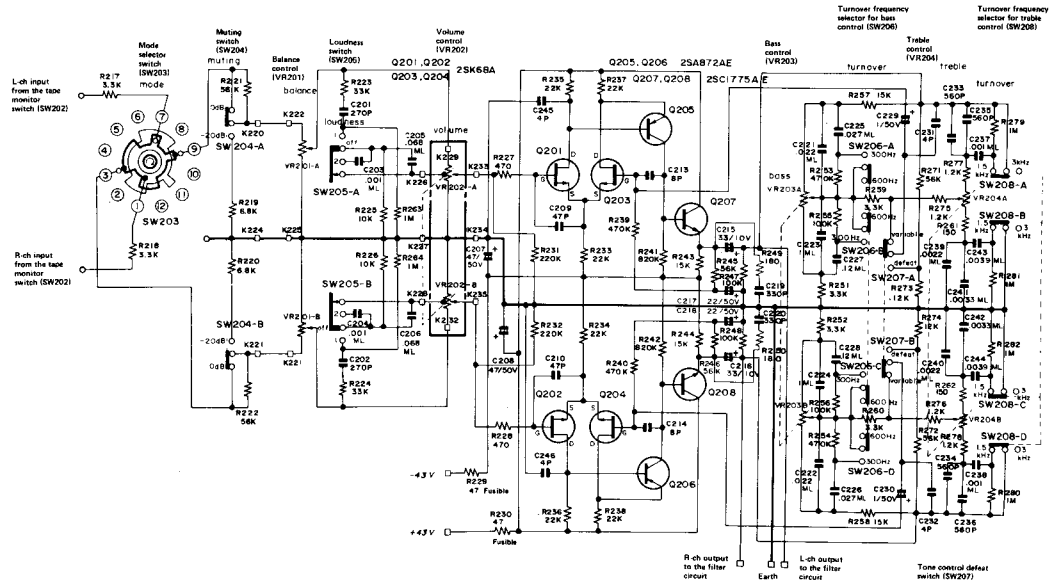


Figure 10

FILTER CIRCUIT (Refer to Figures 11 and 12)

As filter circuit, this set is provided with two filters, say, a low-cut filter and high-cut filter. In the low-cut filter circuit, the low-cut filter switch (SW301) is able to attenuate the low-frequency range (of lower than 10 Hz or 30 Hz) at the rate of 12 dB/octave and in the high-cut filter circuit, the high-cut filter switch (SW302) does the same for the high-frequency range (of higher than 7 kHz or 20 kHz) at the rate of 6 dB/octave. The low-cut filter circuit is an NF type filter circuit which is made of emitter follower transistor (Q301 or Q302). With this circuit, there are two frequency characteristics 10Hz, 12dB/octave and 30Hz, 12dB/octave---the former is determined by the constant assured by the capacitors (C303 and C305 and C307, or C304 and C306 and C308) and the resistors (R307 and R309, or R308 and R310) while the latter, by the constant depended on the capacitors (C301 and C309, or C302 and Q302) and the resistors (R305 and R309, or R306 and R310). Signals output from the emitter of the transistor (Q301 or Q302) enter the high-cut filter circuit via the coupling capacitor (C311 or C312) and low-cut filter switch (SW301). The high-cut filter circuit is a CR attenuated filter circuit and with this circuit, there will be two frequency characteristics 7kHz, 6dB/octave and 20kHz, 6dB/octave---the former is decided by the constant depended on the capacitor (C313 or C314) and the resistor (R315, R316) while the latter, by that resulted from the capacitor (C315 or C316) and the resistor (R315, R316).

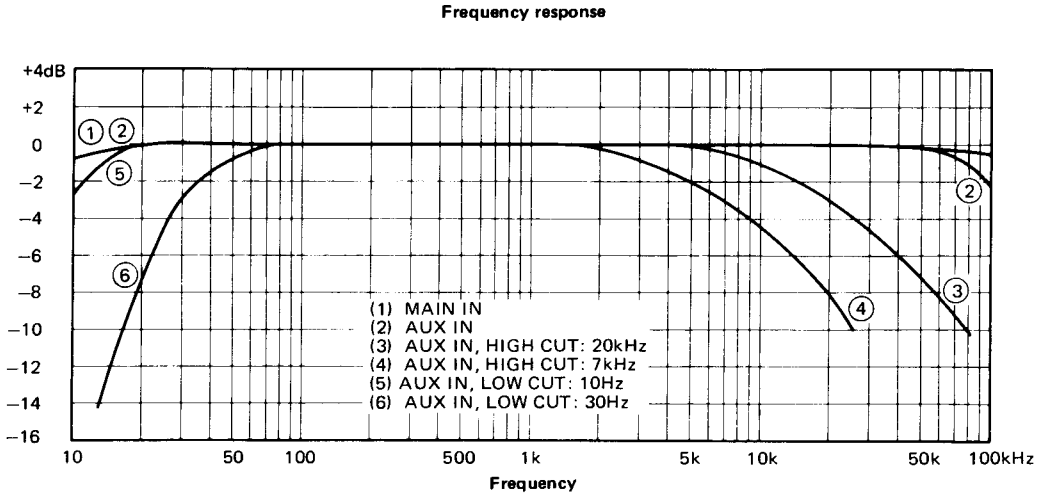


Figure 11

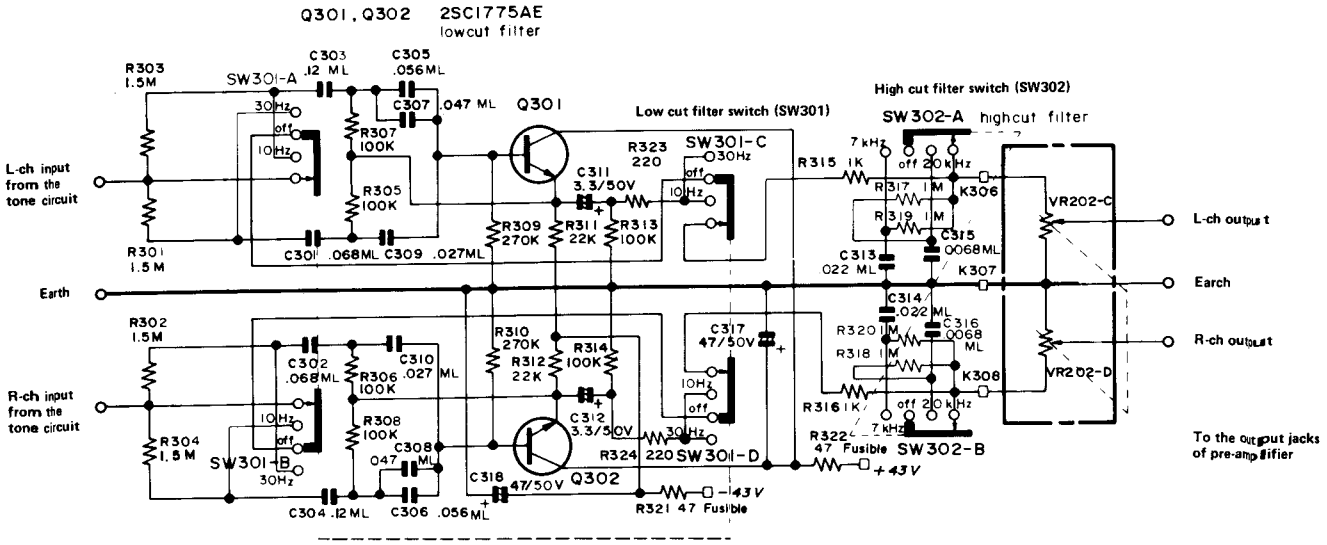


Figure 12

MAIN AMPLIFIER CIRCUIT (Refer to Figures 13, 14 and 15)

The main amplifier circuit is a 1-stage differential, all-stage direct-coupled symmetrical complementary circuit and it employs at the first stage a differential amplifier made of low-noise dual transistor (Q401 or Q402) and at the power amplifier stage, Darlington pack (IC401 or IC402) so that it requires no further adjustment. The signal coming from the filter circuit is amplified by the differential amplifier made of low-noise dual transistor (Q401 or Q402) via coupling capacitor (C401 or C402) and resistor (R403 or R404), and then applied to the base of transistor (Q405 or Q406), --- the signal output from the collector of transistor (Q405 or Q406) serves to drive the complementary circuit inside Darlington pack (IC401 or IC402). Transistor (Q403 or Q404) is a constant current load for the transistor (Q405 or Q406). The gain of main amplifier depends on the resistors ratio (R421 and R415 or R422 and R416) and the bigger the ratio, the larger the gain of main amplifier. Capacitor (C411 or C412) is time constant in the combination with resistor (R415 or R416) and this time constant determines feedback amount at the low-frequency band. Resistor (R429 or R430) and capacitor (C427 or C428) are to keep the power amplifier stabilized when given no load. Coil (L401 or L402) is for the purpose to prevent high-frequency oscillation. Capacitors (C407 and C415 and C425 or C408 and C416 and C426) are for phase compensation at the high-frequency band. Transistor (Q407 or Q408) works as protection circuit.

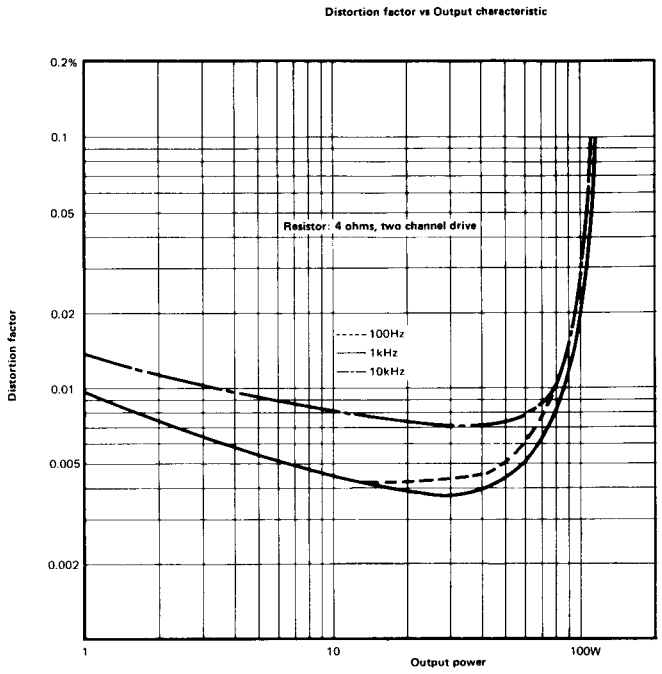


Figure 13

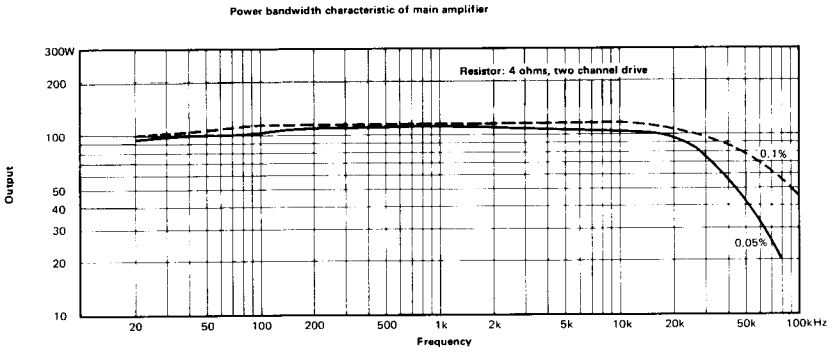


Figure 14

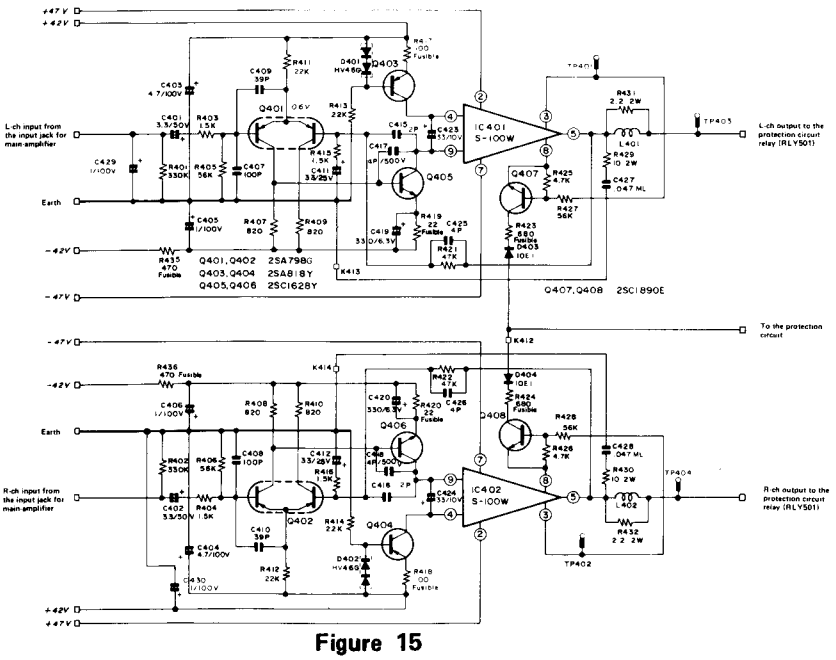


Figure 15

PROTECTION CIRCUIT (Refer to Figure 16)

The protection circuit can function in the following instances: (1) the power switch is turned on (2) the power switch is turned off (3) DC voltage is produced at the speaker terminal (for instance, when DC voltage gets unbalanced due to a trouble inside the amplifier) (4) the heat sink abnormally increase its temperature (5) the speaker terminals are shorted and the load impedance is lowered (for instance, when several speakers are connected in parallel to the amplifier).

- When the power switch is set to 'on ' position, until the power supply voltage to the protection circuit will become stabilized, a current runs in resistors (R508 and R509) and capacitor (C507) and since the base voltage of transistor (Q503) is kept lower than its emitter voltage, the transistor (Q503) is switched on while those (Q504 and Q505) are switched off so that the protection circuit relay (RLY 501) will be given no current. Next, when the power supply voltage is then stabilized, it is charged at the capacitor (C507) through the resistors (R508 and R509) and since the base voltage of transistor (Q503) becomes similar to its emitter voltage, the transistor (Q503) is switched off while those (Q504 and Q505) are switched on to cause a current run in the relay so that output signal of the amplifier be connected to the speaker terminals. It takes about 5 seconds from the time the power switch is turned on until there will be connection between the amplifier output and speaker terminals.
- When the power switch is set to 'off' position, negative voltage which has been applied to the amplifier through diode (D501) and resistor (R501) is cancelled and instead positive voltage [charged at electrolytic capacitor (C618)] is supplied to the amplifier via resistor (R502) to turn on transistor (Q502) and since the base voltage of transistor (Q503) becomes lower than its emitter voltage, the transistor (Q503) is switched on while those (Q504 and Q505) are switched off. As a result, the relay will be given no current and output signal of the amplifier be disconnected from the speaker terminals. It is instantly when the power switch is turned off that there is disconnection between the amplifier output and speaker terminals.
- If DC voltage is generated at the speaker terminals, positive (+) or negative (−) voltage is applied to transistors (Q501 and Q502) through resistors (R515 and R516). As for the positive voltage, it is applied to the base of transistor (Q502) via resistor (R505) so as to switched on transistor (Q502). As for the negative voltage, since the emitter voltage of transistor (Q501) becomes lower than its base voltage, the transistor (Q501) is switched on, resulting in the same as stated in the foregoing paragraph: the relay will be given no current to make the amplifier and speaker terminals be disconnected from each other.
- When the temperature of heat sink increases abnormally, resistance value of over-heat preventive posistor (PH501 and PH502) provided at the heat sink is also increased and as a result voltage is applied to the base of transistor (Q502) via resistors (R503 and R504) and diode (D502) so that the transistor (Q502) be switched on. This results in the same as said in the foregoing paragraph: there will be no current running in the relay to disconnect the amplifier output and speaker terminals from each other.
- If the speaker terminals are shorted or load impedance is lessened, this causes in the power transistor of Darlington pack (IC401 and IC402) that the voltage produced (between the terminals 3 and 8) by its emitter resistance becomes higher than as specified so that there will be a potential difference between the base and emitter of transistor (Q407 or Q408). Accordingly, the transistor (Q407 or Q408) is switched on so that there will be a current running through diode (D403 or D404) to have transistor (Q503) be switched on while those transistors (Q504 and Q505) be off.

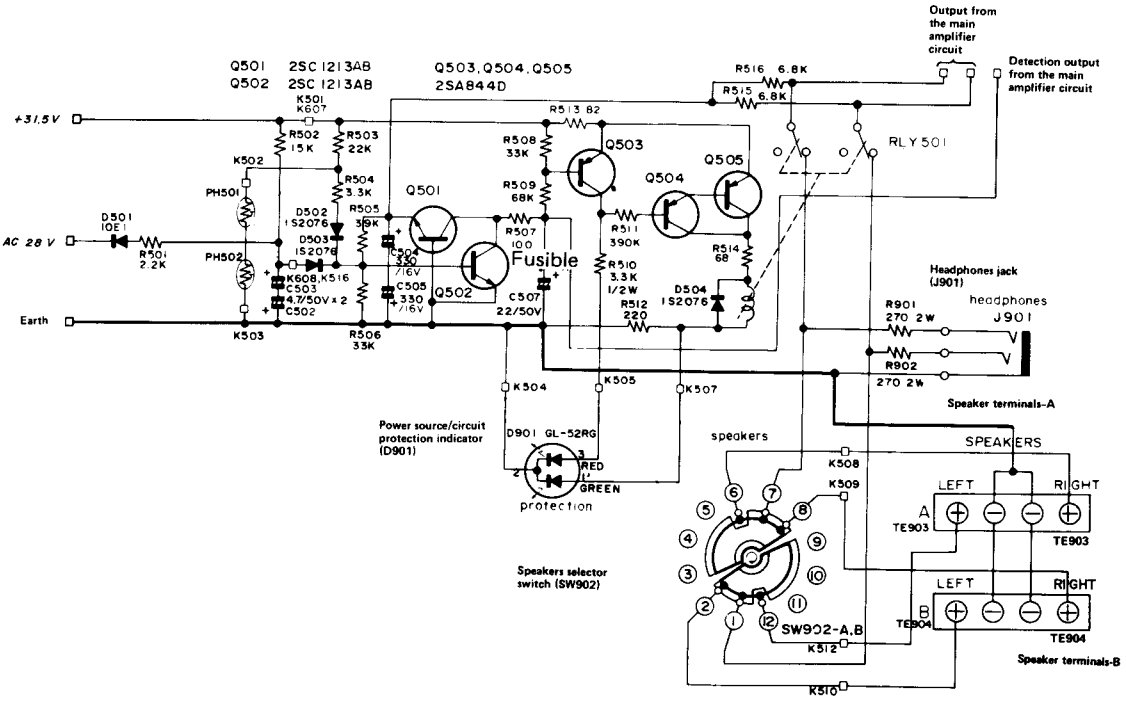


Figure 16

POWER SUPPLY CIRCUIT (Refer to Figure 17)

The power supply circuit is on the basis of a 3-transformer 7-power supply system. In class-B amplifier stage of the main amplifier section which requires a big power, there are two independent power supplies one each for right and left channels. And in class-A amplifier stage of the main amplifier section and pre-amplifier stage section, there are also two regulated power supplies one each for both amplifier stages. This helps to eliminate intermodulation distortion as well as dynamic cross-talk between the right and left channels. Transformer (T901 or T902) is E.I. class-B amplifier stage of the right and left main amplifiers. AC power supply from this transformer is converted into DC one by the bridged rectifier circuit consisting of diodes (D601 to D604 or D609 to D612) to be charged in low-impedance dual capacitor (C905 or C906) and simultaneously power is supplied to the main amplifier. Capacitors (C601 to C604 or C609 to C612) are for the purpose to eliminate switching noise due to diodes (D601 to D604 or D609 to D612) and further to remove noises coming from the power supply primary side. Resistors (R903 and R904 or R905 and R906) are to let capacitor (C905 or C906) be discharged when the power switch is turned off. Transformer (T903) is an exclusive power supply source to the class-A amplifier stage of the right and left main amplifiers and to the equalizer/tone circuit. AC power supply from this transformer is converted into DC one by the bridged rectifier circuit composed of diodes (D605 to D608) to be charged in capacitors (C613 and C614). Charged power supply voltage is available in two types, +68V and −68V: the positive voltage and negative voltage are applied to the regulated power supply circuit made of transistors (Q601 and Q603 and Q605) and that made of (Q602 and Q604 and Q606) respectively. The transistor (Q605 or Q606) is for the purpose of output voltage detection and it behaves in such a way that the reference voltage designated by zener diode (ZD601 or ZD602) is compared with the voltage which has been subjected to potential division by resistors (R609 and R611 or R610 and R612). For instance, if the positive output voltage rises up, the base voltage of transistor (Q605) also rises up, a current begins to run through its collector to emitter so that there arises a voltage drop of resistors (R601 and R603) to let the base voltage of transistor (Q603) decrease. This results in that the base voltage of transistor (Q601) goes down and the collector-to-emitter resistance of transistor (Q601) is increased so that the output voltage will be decreased.

On the contrary to the above, if the output voltage is decreased to lower than the reference one, it will be increased as a result of the operations being taken reversely to the above. Electrolytic capacitor (C621 or C622) is to absorb noises due to zener diode (ZD601 or ZD602) while electrolytic capacitor (C619 or C620) serves as a ripple filter. Output voltage from the regulated power supply circuit is applied to not only the class-A amplifier stage of main amplifier but also the equalizer/tone circuit via the ripple filter circuit (Q607 or Q608).

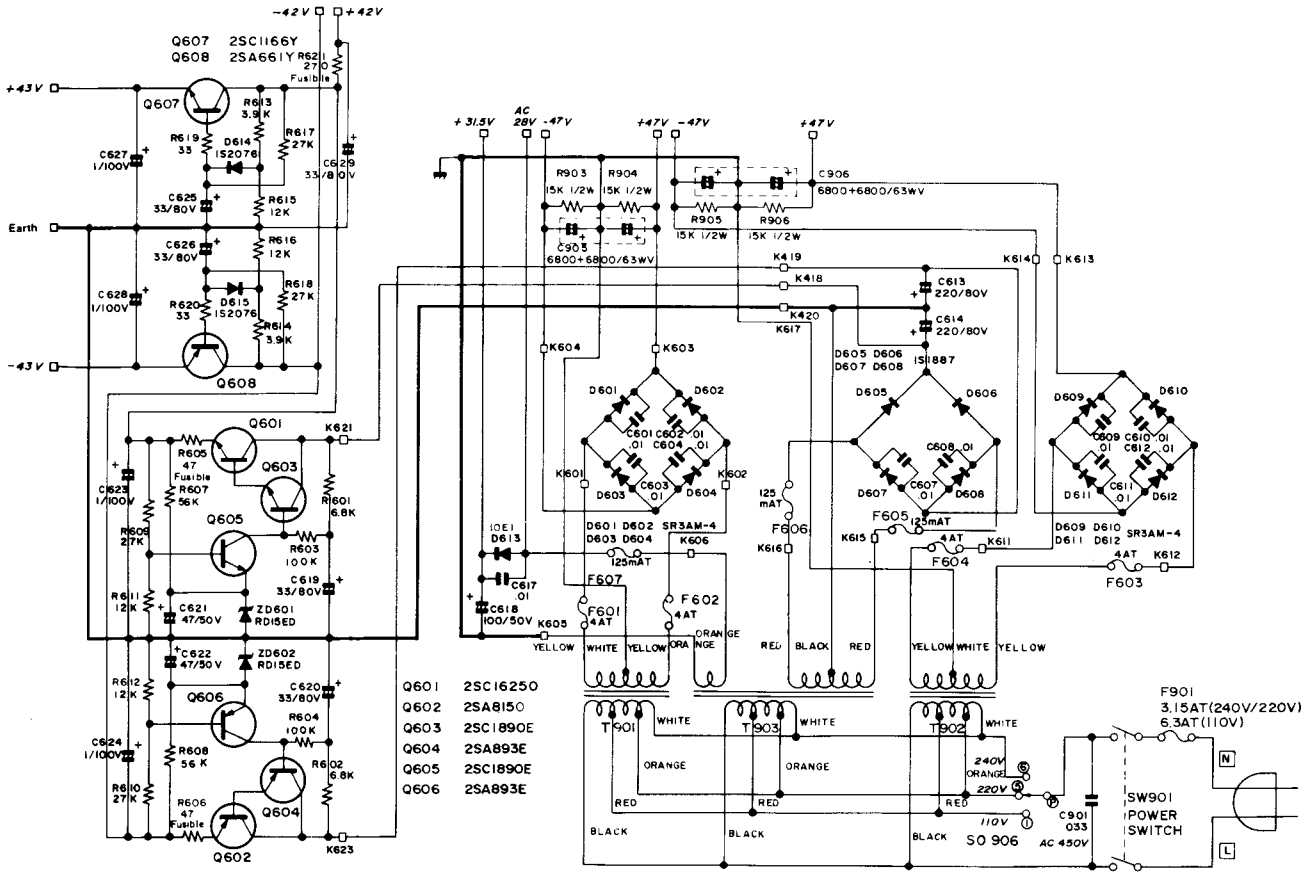


Figure 17

REPLACEMENT OF DARLINGTON PACK (IC 401 and IC 402) (Refer to Figure 18)

To replace the Darlington pack with a new one, remove the two screws retaining the Darlington pack and its legs from the printed wiring board. Then apply silicon grease to a new Darlington pack (at the surface which will be in contact with the heat sink) and insert its legs to the printed wiring board and tighten it by using the two screws. After that, solder the said legs to the printed wiring board.

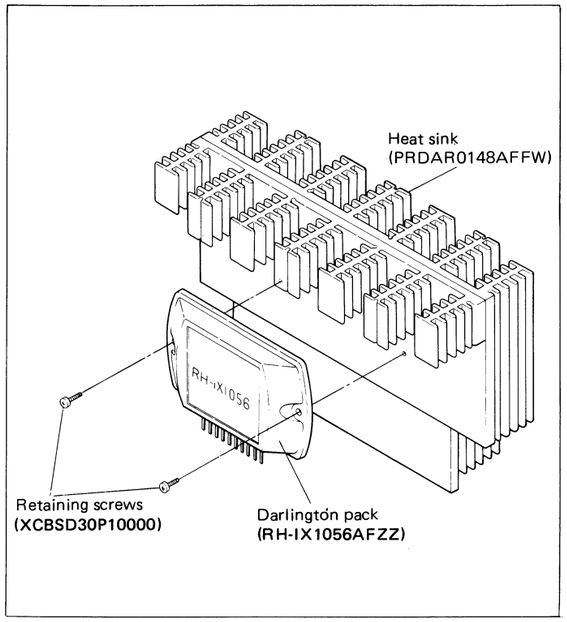


Figure 18

INTERNAL CIRCUIT OF DARLINGTON CIRCUIT IC401, IC402 (RH-IX1056AFZZ)

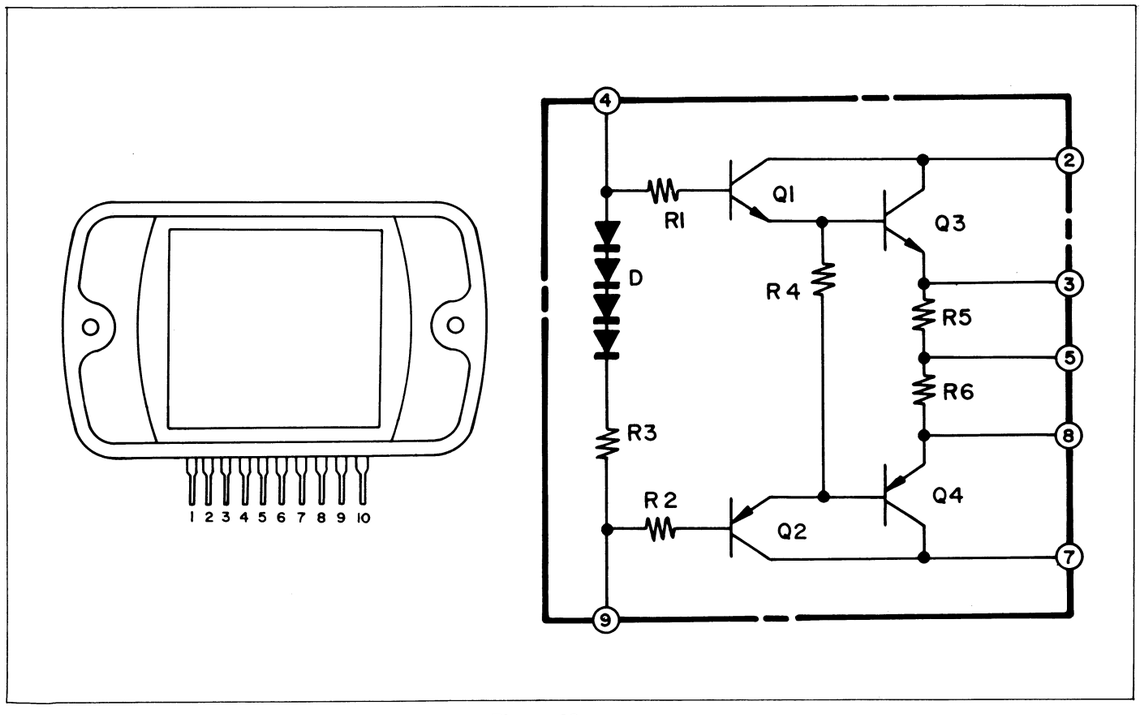
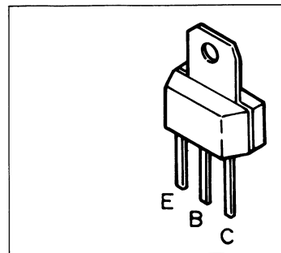
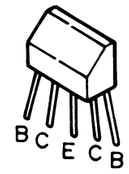


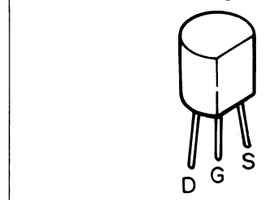
Figure 19



Q403, Q404, Q405, Q406

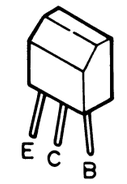


Q401, Q402

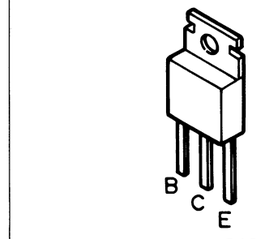


Q101, Q102, Q103, Q104,
Q201, Q202, Q203, Q204

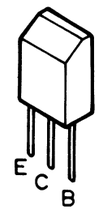
S: Source
G: Gate
D: Drain



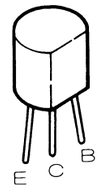
Q105, Q106
Q107, Q108
Q501, Q502



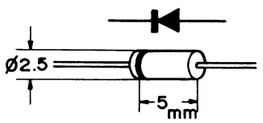
Q601, Q602



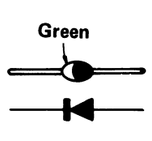
Q607, Q608



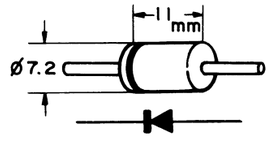
Q109, Q110, Q111, Q112,
Q115, Q116, Q117, Q118,
Q205, Q206, Q207, Q208,
Q301, Q302, Q407, Q408,
Q503, Q504, Q505, Q603,
Q604, Q605, Q606



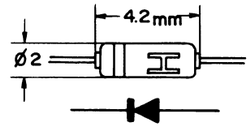
D403, D404, D501, D613



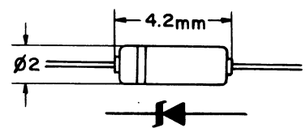
D401, D402



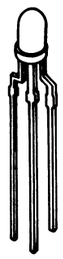
D601 ~ D604
D609 ~ D612



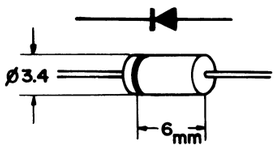
D502, D503, D504,
D614, D615



ZD601, ZD602



D901



D605 ~ D608

Figure 20 TERMINAL GUIDE OF TRANSISTORS AND DIODES

	Mains supply cord	Bushing	Mains plug	Safety standards
①	QACCN0001AGZZ	LBSHC0004AGZZ		SEMKO
	QACCZ0052AFZZ	LBSHC0004AGZZ		
②	QACCB0051AF00	LBSHC0002AGZZ		BEAB
	QACCL4001SE08	LBSHC0002AGZZ		SAA
③	QACCS9001SE00	LBSHC0007AFZZ	QPLGA0205AGZZ	SEV
	QACCZ0002AG08	LBSHC0007AFZZ	QPLGA0201AGZZ	
	QACCZ0002TA0F	LBSHC0007AFZZ		

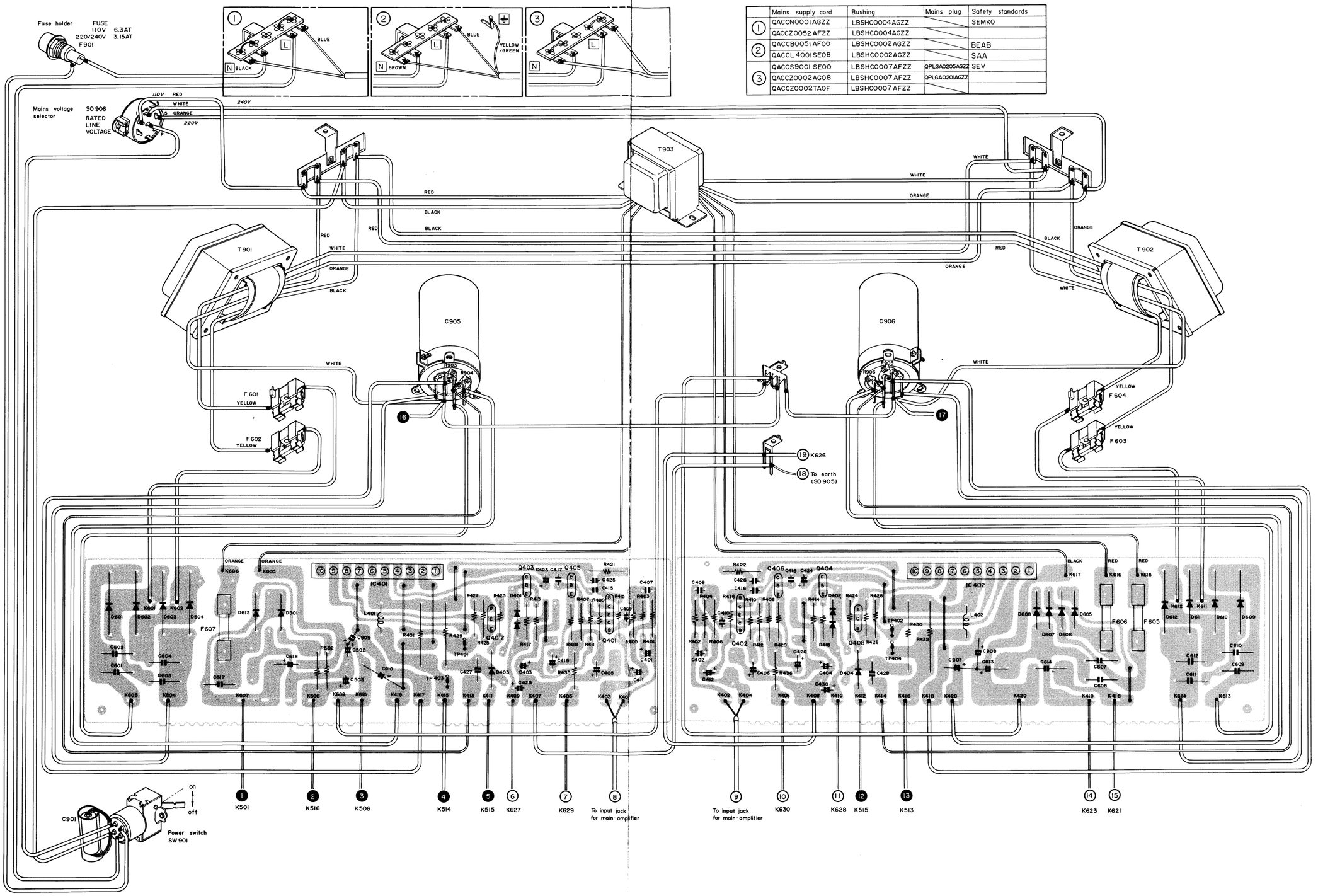


Figure 21 WIRING SIDE OF MAIN AMP. PRINTED WIRING BOARD

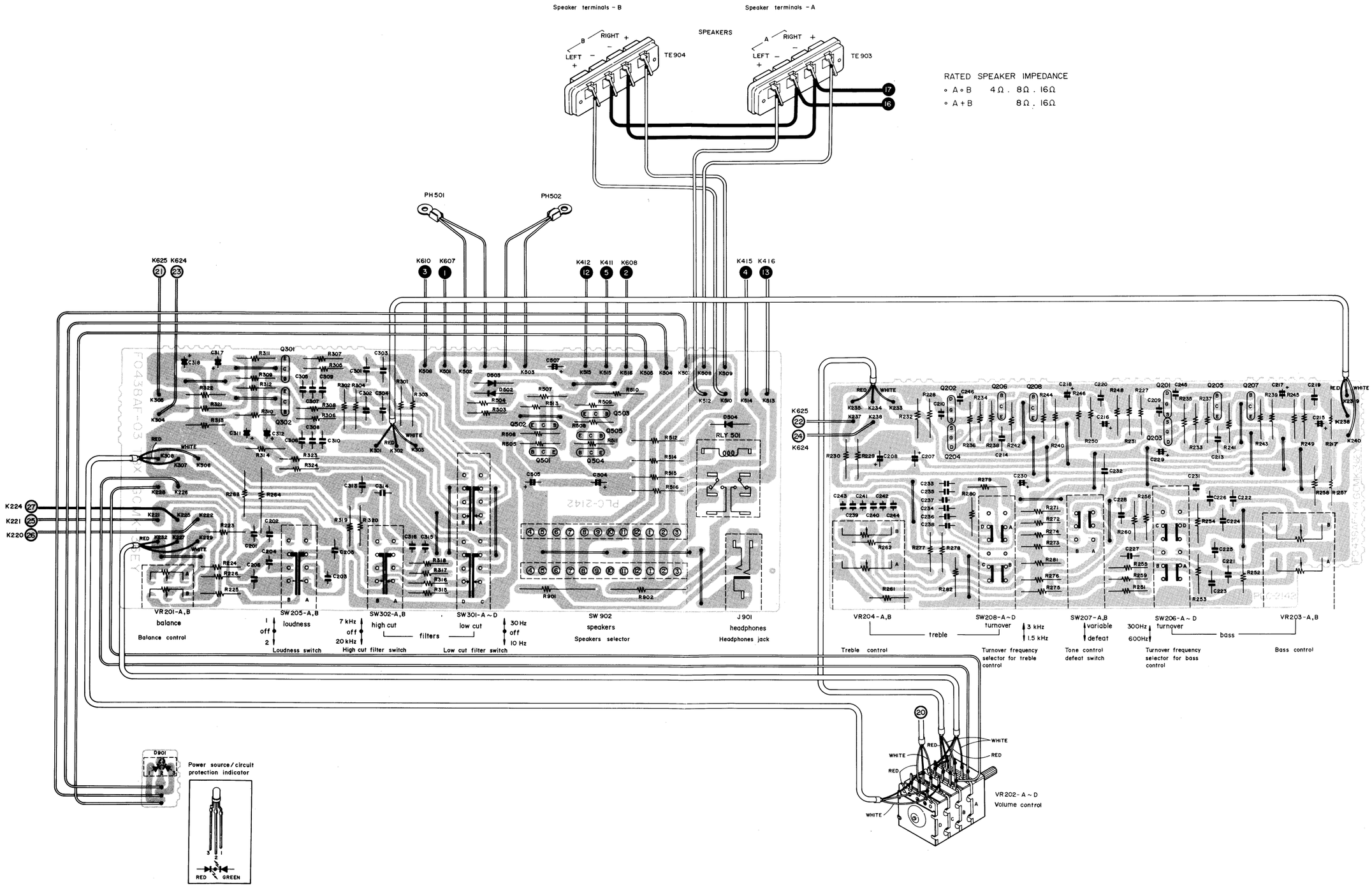


Figure 22 WIRING SIDE OF TONE/FILTER CIRCUIT PRINTED WIRING BOARD

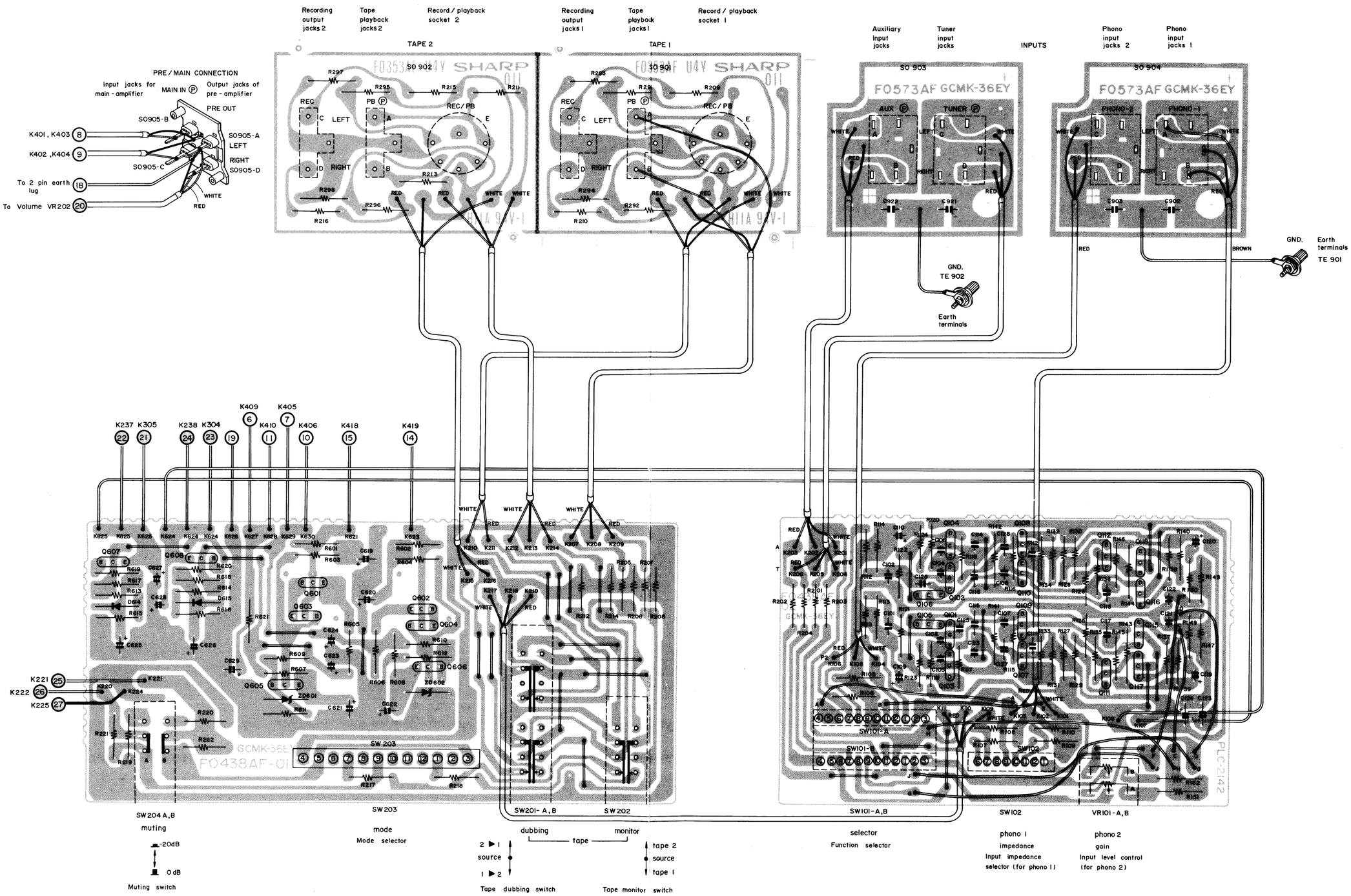
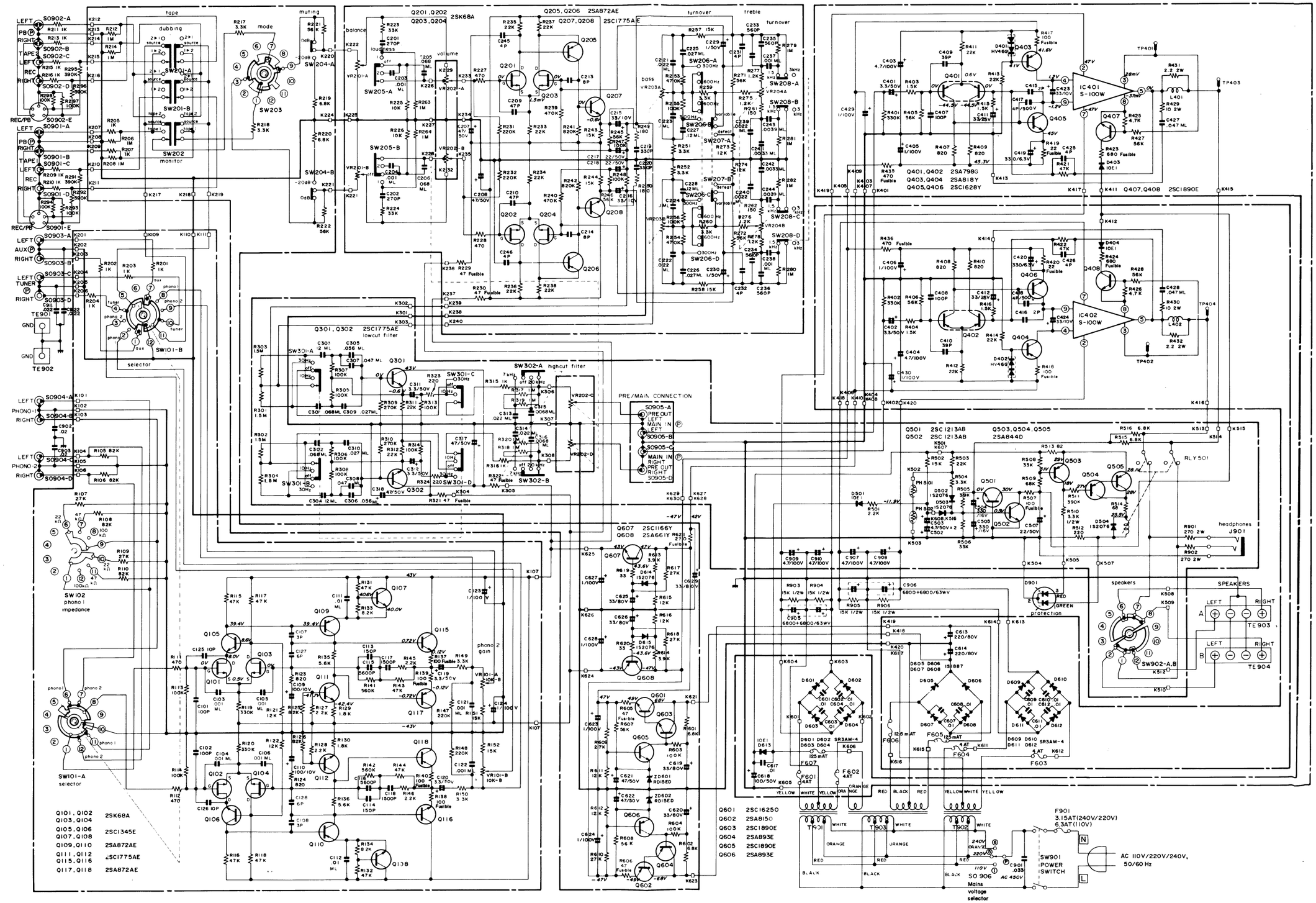


Figure 23 WIRING SIDE OF EQUALIZER CIRCUIT PRINTED WIRING BOARD

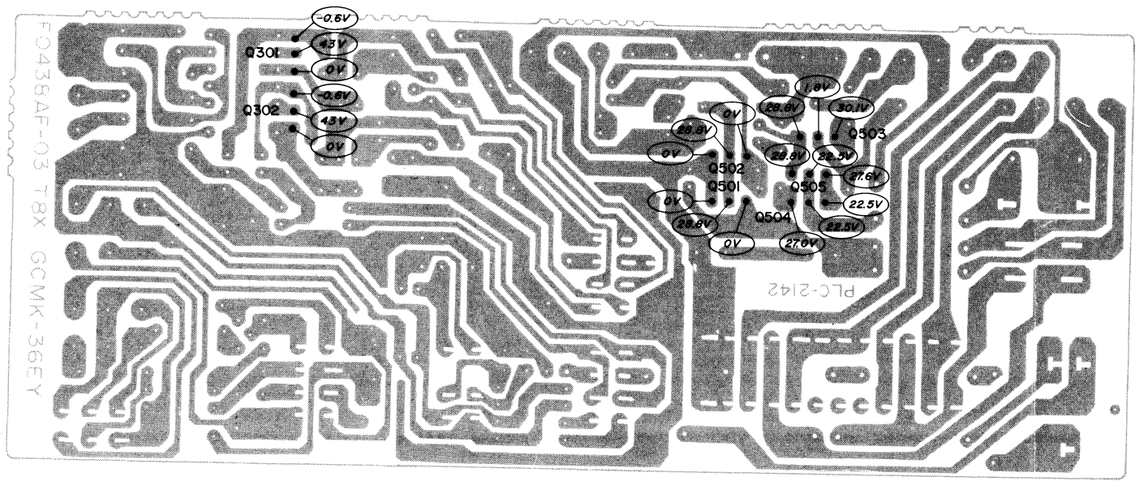
NOTES:

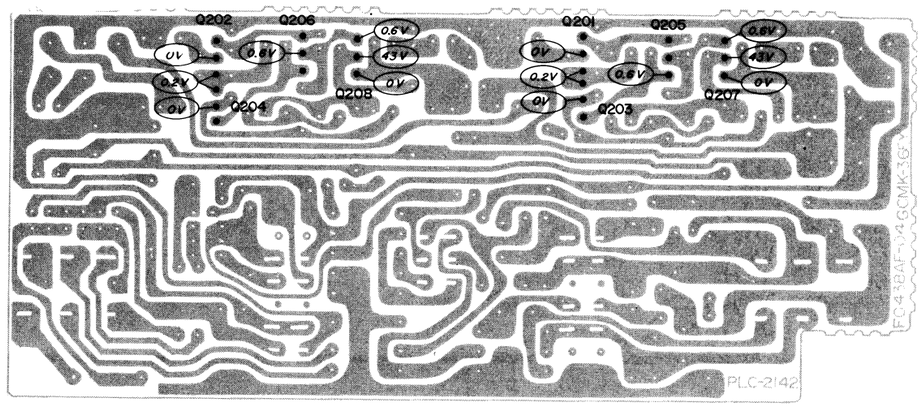
1. SW101 (A, B): Function selector switch. (Shown in 'aux' position.)
2. SW102: Input impedance selector (for phono 1) switch. (Shown in '22kohm' position.)
3. SW201 (A, B): Tape dubbing switch. (Shown in 'source' position.)
4. SW202: Tape monitor switch. (Shown in 'source' position.)
5. SW203: Mode selector switch. (Shown in 'normal' position.)
6. SW204 (A, B): Muting switch. (Shown in '0dB' position.)
7. SW205 (A, B): Loudness switch. (Shown in 'off' position.)
8. SW206 (A ~ D): Turnover frequency selector for bass control switch. (Shown in '600Hz' position.)
9. SW207 (A, B): Tone control defeat switch. (Shown in 'variable' position.)
10. SW208 (A ~D): Turnover frequency selector for treble control switch. (Shown in '1.5kHz' position.)
11. SW301 (A ~ D): Low cut filter switch. (Shown in 'off' position.)
12. SW302 (A, B): High cut filter switch. (Shown in 'off' position.)
13. SW901: Power switch. (Shown in 'off' position.)
14. SW902 (A, B): Speakers selector switch. (Shown in 'a' position.)
15. Unless otherwise specified. All resistance in ohms. K=1,000ohms. Besides, the one with 'Fusible' is a fuse type.
16. Unless otherwise specified. All capacitance in microfarads. P=micro-micro farads.
17. The indicated voltage in each section is the one mesured by V.T.V.M. between such a section and the chassis with no signal being given.

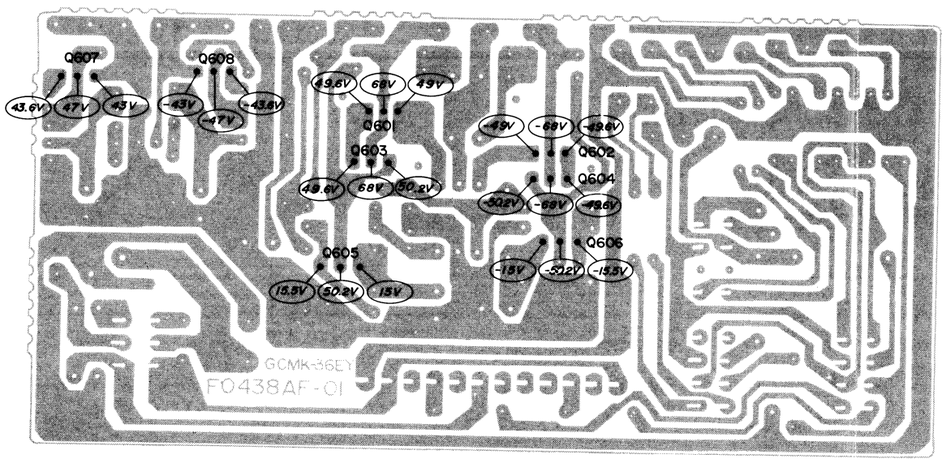


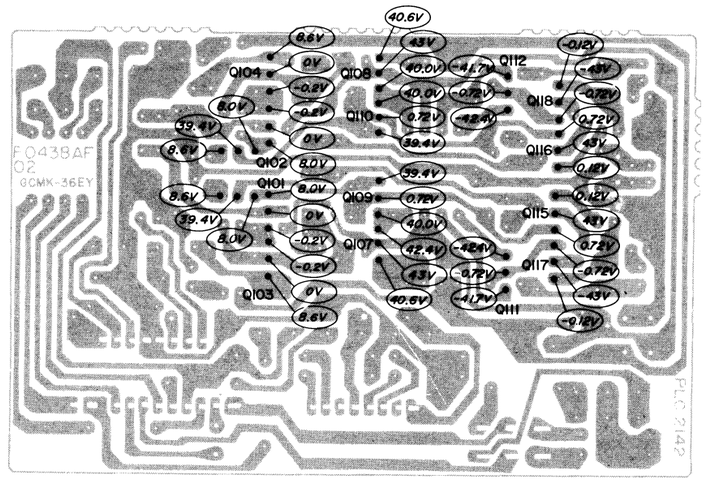
(Specifications or wiring diagrams of this model are subject to change for the improvement without prior notice.)

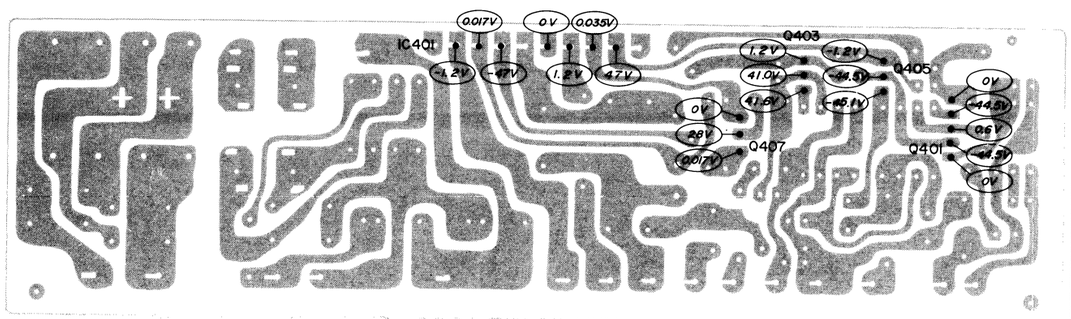
Figure 24 SCHEMATIC DIAGRAM











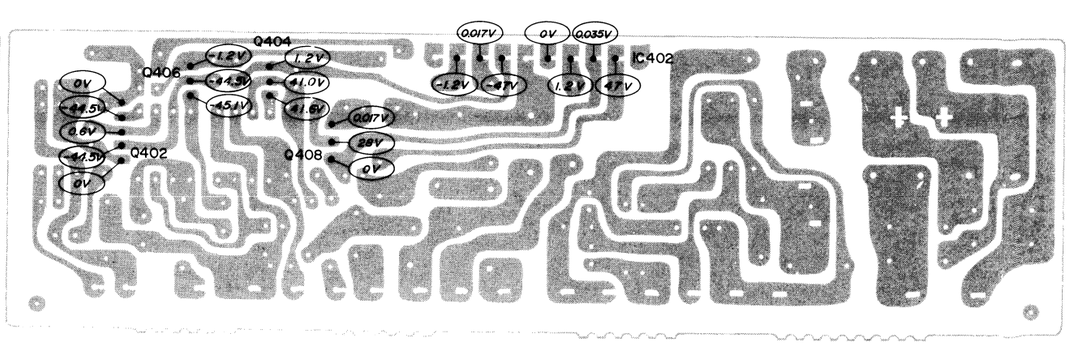
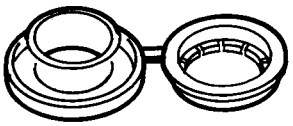
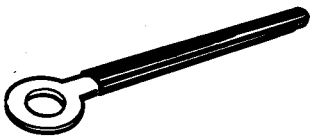


Figure 25 VOLTAGES ON PRINTED WIRING BOARD (Circuit tester range: DC voltage (20kohms/volt.) range.)

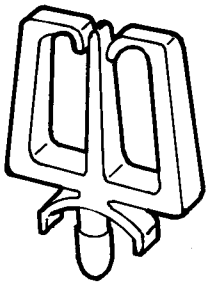
LBSHC0056AFZZ



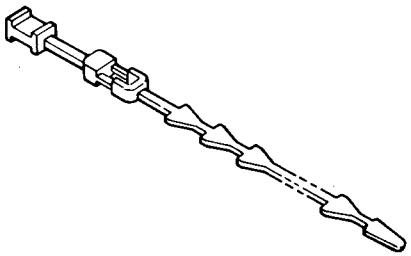
LHLDW9003CEZZ



LHLDW1060AFZZ



LHLDW1052AFZZ



LHLDF1204AFZZ

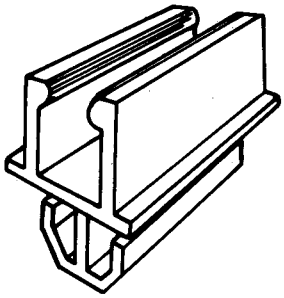


Figure 26 MISTAKABLE PARTS

REPLACEMENT PARTS LIST

"HOW TO ORDER REPLACEMENT PARTS"

To have your order filled promptly and correctly, please furnish the following informations.

1. MODEL NUMBER
2. REF. NO.
3. PART NO.
4. DESCRIPTION

REF. NO.	PART NO.	DESCRIPTION	CODE
	INTEGRATED CIRCUIT		
IC401	RH-IX1056AFZZ	Power Amp.	
IC402	RH-IX1056AFZZ	Power Amp.	
	TRANSISTORS		
Q101, Q102	VS2SK68A///1F	Equalizer Differential Amp.	AF
Q103, Q104	VS2SK68A///1F	Equalizer Differential Amp.	AF
Q105, Q106	VS2SC1345-E-1	Constant Voltage Load	AD
Q107, Q108	VS2SC1345-E-1	Constant Voltage Load	AD
Q109, Q110	VS2SA872A-E-1	Common Emitter Circuit	AD
Q111, Q112	VS2SC1775AE-1	Constant Current Load	AE
Q115, Q116	VS2SC1775AE-1	SEPP Amp.	AE
Q117, Q118	VS2SA872A-E-1	SEPP Amp.	AD
Q201, Q202	VS2SK68A///1F	Tone Differential Amp.	AF
Q203, Q204	VS2SK68A///1F	Tone Differential Amp.	AF
Q205, Q206	VS2SA872A-E-1	Common Emitter Circuit	AD
Q207, Q208	VS2SC1775AE-1	Emitter Follower Circuit	AE
Q301, Q302	VS2SC1775AE-1	Emitter Follower Circuit	AE
Q401, Q402	VS2SA798-G/-1	Differential Amp.	AF
Q403, Q404	VS2SA818-Y/-1	Constant Current Load	AH
Q405, Q406	VS2SC1628-Y-1	Common Emitter Circuit	AH
Q407, Q408	VS2SC1890-E-1	Transient Current Detection	AD
Q501	VS2SC1213AB-1	Abnormal Detection	AD
Q502	VS2SC1213AB-1	Abnormal Detection	AD
Q503	VS2SA844-D/-1	Relay Switching	AD
Q504	VS2SA844-D/-1	Darlington Connection	AD
Q505	VS2SA844-D/-1	Darlington Connection	AD
Q601	VS2SC1625-O-1	Regulated Power Supply	AH
Q602	VS2SA815-O/-1	Regulated Power Supply	AH
Q603	VS2SC1890-E-1	Regulated Power Supply	AD
Q604	VS2SA893-E/-1	Regulated Power Supply	AD
Q605	VS2SC1890-E-1	Voltage Comparison	AD
Q606	VS2SA893-E/-1	Voltage Comparison	AD
Q607	VS2SC1166-Y-1	Ripple Filter	AE
Q608	VS2SA661-Y/-1	Ripple Filter	AE

REF. NO.	PART NO.	DESCRIPTION	CODE
	DIODES		
D401	VHVHV46-G//-1	Bias Stabilizer	AC
D402	VHVHV46-G//-1	Bias Stabilizer	AC
D403	VHD10E1////-1	Back Current Prevention	AC
D404	VHD10E1////-1	Back Current Prevention	AC
D501	VHD10E1////-1	Voltage Detector	AC
D502	VHD1S2076//-1	Malfunction Prevention	AB
D503	VHD1S2076//-1	Malfunction Prevention	AB
D504	VHD1S2076//-1	Surge Absorber	AB
D601, D602, D603, D604	VHDSR3AM-4/-1	Rectifier	AF
D605, D606, D607, D608	VHD1S1887//-1	Rectifier	AD
D609, D610, D611, D612	VHDSR3AM-4/-1	Rectifier	AF
D613	VHD10E1////-1	Rectifier	AC
D614, D615	VHD1S2076//-1	Working Stabilizer	AB
D901	VHPGL-52RG/1F	Light Emitting Type	AK
ZD601, ZD602	VHERD15ED//1F	Zener	AD
PH501, PH502	RH-QX1001AFZZ	Positive Coefficient Thermistor	AF
	COILS		
L401, L402	RCILZ0050AFZZ	Load Capacity Correction, 0.8μH	AD
	TRANSFORMERS		
T901	RTRNP0500AFZZ	Left Channel Main Amp. Power Source	BN
T902	RTRNP0500AFZZ	Right Channel Main Amp. Power Source	BN
T903	RTRNP0501AFZZ	Power Source	AY
	CONTROLS		
VR101A, B	RVR-B0146AFZZ	10K(B) ohm, Input Level Control (For Phono 2)	AH
VR201A, B	RVR-G0051AFZZ	100K(MN) ohm, Balance Control	AH
VR202A, B, C, D	RVR-Z0059AFZZ	100K(B) ohm+10K(B) ohm, Volume Control	AX
VR203A, B	RVR-Z0050AFZZ	100K(C) ohm, Bass Control	AS

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
VR204A, B	RVR-Z0050AFZZ	100K(C) ohm, Treble Control	AS
	ELECTROLYTIC CAPACITORS		
C109, C110	RC-EZ1007AFZZ	100MFD, 10V, +50—10%	AC
C119, C120	VCEALU1HW335M	3.3MFD, 50V, ±20%	AC
C123, C124	VCEAAU2AW105A	1MFD, 100V, +75—10%	AB
C207, C208	RC-EZ1012AFZZ	47MFD, 50V, +50—10%	AC
C215, C216	RC-EZ1014AFZZ	33MFD, 10V, ±20%	AC
C217, C218	VCEALU1HW224M	.22MFD, 50V, ±20%	AB
C229, C230	VCEALU1HW105M	1MFD, 50V, ±20%	AD
C311, C312	VCEALU1HW335M	3.3MFD, 50V, ±20%	AC
C317, C318	RC-EZ1012AFZZ	47MFD, 50V, +50—10%	AC
C401, C402	VCEALU1HW335M	3.3MFD, 50V, ±20%	AC
C403, C404	VCEAAU2AW475A	4.7MFD, 100V, +75—10%	AB
C405, C406	VCEAAU2AW105A	1MFD, 100V, +75—10%	AB
C411, C412	RC-EZ1010AFZZ	33MFD, 25V, +50—10%	AC
C419, C420	RC-EZ1011AFZZ	330MFD, 6.3V, +50—10%	AC
C423, C424	RC-EZ1014AFZZ	33MFD, 10V, ± 20%	AB
C429, C430	VCEAAU2AW105A	1MFD, 100V, +75—10%	AB
C502, C503	VCEAAU1HW475A	4.7MFD, 50V, +75—10%	AD
C504, C505	VCEAAU1CW337Y	330MFD, 16V, +50—10%	AC
C507	VCEALU1HW226M	22MFD, 50V, ±20%	AG
C613, C614	VCEAAU1KW227Y	220MFD, 80V, +50—10%	AD
C618	VCEAAU1HW107Y	100MFD, 50V, +50—10%	AE
C619, C620	VCEAAU1KW336Y	33MFD, 80V, +50—10%	AC
C621, C622	RC-EZ1012AFZZ	47MFD, 50V, +50—10%	AB
C623, C624	VCEAAU2AW105A	1MFD, 100V, +75—10%	AE
C625, C626	VCEAAU1KW336Y	33MFD, 80V, +50—10%	AB
C627, C628	VCEAAU2AW105A	1MFD, 100V, +75—10%	AE
C629	VCEAAU1KW336Y	33MFD, 80V, +50—10%	BB
C905, C906	RC-EZ1004AFZZ	6800MFD + 6800MFD, 63V, +50—10%	
C907, C908, C909, C910	VCEAAU2AW475A	4.7MFD, 100V, +75—10%	

REF. NO.	PART NO.	DESCRIPTION	CODE
	CAPACITORS		
C101, C102	VCQSMU1HS101J	100PF, 50V, ±5%, Polystyrene	AC
C103, C104	VCQYKU1HM102K	.001MFD, 50V, ±10%, Mylar	AB
C105, C106	VCQYKU1HM102K	.001MFD, 50V, ±10%, Mylar	AB
C107, C108	VCCSPU1HL3R0C	3PF, 50V, ±.25PF, Ceramic	
C111, C112	VCQYKU1HM103K	.01MFD, 50V, ±10%, Mylar	AB
C113, C114	VCQSMU1HD151J	150PF, 50V, ±5%, Polystyrene	AB
C115, C116	VCQSMU1HD562G	5600PF, 50V, ±2%, Polystyrene	AD
C117, C118	VCQSMU1HD152G	1500PF, 50V, ±2%, Polystyrene	AD
C121, C122	VCQYKU1HM102J	.001MFD, 50V, ± 5%, Mylar	AC
C125, C126	VCCSPU1HL100C	10PF, 50V, ±.25PF, Ceramic	
C127, C128	VCCSPU1HL6R0C	6PF, 50V, ±.25PF, Ceramic	
C201, C202	VCCSPU1HL271K	270MFD, 50V, ±10%, Ceramic	
C203, C204	VCQYKU1HM102K	.001MFD, 50V, ±10%, Mylar	AB
C205, C206	VCQYKU1HM683K	.068MFD, 50V, ±10%, Mylar	AC
C209, C210	VCCSPU1HL470K	47PF, 50V, ±10%, Ceramic	
C213, C214	VCCSPU1HL8R0C	8PF, 50V, ±.25PF, Ceramic	
C219, C220	VCQSMU1HS331J	330PF, 50V, ±5%, Polystyrene	AC
C221, C222	VCQYKU1HM223J	.022MFD, 50V, ±5%, Mylar	AC
C223, C224	VCQYKU1HM104J	1MFD, 50V, ±5%, Mylar	AD
C225, C226	VCQYKU1HM273J	.027MFD, 50V, ±5%, Mylar	AC
C227, C228	VCQYKU1HM124J	.12MFD, 50V, ±5%, Mylar	AE
C231, C232	VCCSPU1HL4R0C	4PF, 50V, ±.25PF, Ceramic	
C233, C234	VCCSPU1HL561J	560PF, 50V, ±5%, Ceramic	
C235, C236	VCCSPU1HL561J	560PF, 50V, ±5%, Ceramic	
C237, C238	VCQYKU1HM102J	.001MFD, 50V, ±5%, Mylar	AC
C239, C240	VCQYKU1HM222J	.0022MFD, 50V, ±5%, Mylar	AB
C241, C242	VCQYKU1HM332J	.0033MFD, 50V, ±5%, Mylar	AC
C243, C244	VCQYKU1HM392J	.0039MFD, 50V, ±5%, Mylar	AC
C245, C246	VCCSPU1HL4R0C	4PF, 50V, ±.25PF, Ceramic	
C301, C302	VCQYKU1HM683J	.068MFD, 50V, ±5%, Mylar	AD

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
C303, C304	VCQYKU1HM124J	.12MFD, 50V, ±5%, Mylar	AE
C305, C306	VCQYKU1HM563J	.056MFD, 50V, ±5%, Mylar	AC
C307, C308	VCQYKU1HM473J	.047MFD, 50V, ±5%, Mylar	AC
C309, C310	VCQYKU1HM273J	.027MFD, 50V, ±5%, Mylar	AC
C313, C314	VCQYKU1HM223J	.022MFD, 50V, ±5%, Mylar	AC
C315, C316	VCQYKU1HM682J	.0068MFD, 50V, ±5%, Mylar	AC
C407, C408	VCCSPU1HL101K	100PF, 50V, ±10%, Ceramic	
C409, C410	VCCSPU1HL390K	39PF, 50V, ±10%, Ceramic	
C415, C416	VCCSPU1HL2R0C	2PF, 50V, ±.25PF, Ceramic	
C425, C426	VCCSPU1HL4R0C	4PF, 50V, ±.25PF, Ceramic	
C427, C428	VCQYKU1HM473K	.047MFD, 50V, ±10%, Mylar	AC
C601, C602, C603, C604, C607, C608, C609, C610, C611, C612	VCKZPU2TE103Z	.01MFD, 150V, +80–20%, Ceramic	
C617	VCKZPU2TE103Z	.01MFD, 150V, +80–20%, Ceramic	
C901	RC-PZ062CAFZZ	.033MFD, AC450V, ±20%, Oil-filled Paper	AG
C902, C903	VCKZPU1HF203Z	.02MFD, 50V, +80–20%, Ceramic	
C911, C912	VCKZPU1HF223Z	.022MFD, 50V, +80–20%, Ceramic	
C417, C418	VCCSPU2HL4R0C	4PF, 500V, ±.25PF, Ceramic	

RESISTORS

(Unless otherwise specified resistors are 1/4W, ±5%, Carbon type.)

REF. NO.	PART NO.	DESCRIPTION	CODE
R105, R106	VRD-ST2EE823J	82K ohm	
R107	VRD-ST2EE273J	27K ohm	
R108	VRD-ST2EE823J	82K ohm	
R109	VRD-ST2EE273J	27K ohm	
R110	VRD-ST2EE823J	82K ohm	
R111, R112	VRD-ST2EE471J	470 ohm	
R113, R114	VRD-ST2EE104J	100K ohm	
R115, R116	VRN-RT2BC473F	47K ohm, 1/8W, ±1%, Metal Film	
R117, R118	VRN-RT2BC473F	47K ohm, 1/8W, ±1%, Metal Film	
R119, R120	VRN-RT2EC334F	330K ohm, 1/4W, ±1%, Metal Film	
R121, R122	VRD-ST2EE123J	12K ohm	
R123, R124	VRD-ST2EE821J	820 ohm	
R125, R126	VRD-ST2EE823J	82K ohm	
R127, R128	VRD-ST2EE222J	2.2K ohm	
R129, R130	VRD-ST2EE182J	1.8K ohm	
R131, R132	VRN-RT2BC473F	47K ohm, 1/8W, ±1%, Metal Film	
R133, R134	VRN-RT2BC822F	8.2K ohm, 1/8W, ±1%, Metal Film	
R135, R136	VRD-ST2EE562J	5.6K ohm	
R137, R138	VRG-ST2EA101J	100 ohm, 1/4W, ±5%, Fusible	AB
R139, R140	VRG-ST2EA101J	100 ohm, 1/4W, ±5%, Fusible	AB
R141, R142	VRN-RT2EC564F	560K ohm, 1/4W, ±1%, Metal Film	
R143, R144	VRN-RT2BC473F	47K ohm, 1/8W, ±1%, Metal Film	
R145, R146	VRD-ST2EE222J	2.2K ohm	
R147, R148	VRD-ST2EE224J	220K ohm	
R149, R150	VRD-ST2EE332J	3.3K ohm	
R151, R152	VRD-ST2EE153J	15K ohm	
R201, R202	VRD-ST2EE102J	1K ohm	
R203, R204	VRD-ST2EE102J	1K ohm	
R205	VRD-ST2EE102J	1K ohm	
R206	VRD-ST2EE105J	1Meg ohm	
R207	VRD-ST2EE102J	1K ohm	
R208	VRD-ST2EE105J	1Meg ohm	
R209, R210	VRD-ST2EE102J	1K ohm	
R211	VRD-ST2EE102J	1K ohm	
R212	VRD-ST2EE105J	1Meg ohm	
R213	VRD-ST2EE102J	1K ohm	
R214	VRD-ST2EE105J	1Meg ohm	
R215, R216	VRD-ST2EE102J	1K ohm	
R217, R218	VRD-ST2EE332J	3.3K ohm	
R219, R220	VRD-ST2EE682J	6.8K ohm	
R221, R222	VRD-ST2EE563J	56K ohm	
R223, R224	VRD-ST2EE333J	33K ohm	
R225, R226	VRD-ST2EE103J	10K ohm	
R227, R228	VRD-ST2EE471J	470 ohm	
R229, R230	VRG-ST2EA470J	47 ohm, 1/4W, ±5%, Fusible	AB
R231, R232	VRD-ST2EE224J	220K ohm	
R233, R234	VRD-ST2EE223J	22K ohm	

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
R235, R236	VRD-ST2EE223J	22K ohm	
R237, R238	VRD-ST2EE223J	22K ohm	
R239, R240	VRD-ST2EE474J	470K ohm	
R241, R242	VRD-ST2EE824J	820K ohm	
R243, R244	VRD-ST2EE153J	15K ohm	
R245, R246	VRD-ST2EE563J	56K ohm	
R247, R248	VRD-ST2EE104J	100K ohm	
R249, R250	VRD-ST2EE181J	180 ohm	
R251, R252	VRD-ST2EE332J	3.3K ohm	
R253, R254	VRD-ST2EE474J	470K ohm	
R255, R256	VRD-ST2EE104J	100K ohm	
R257, R258	VRD-ST2EE153J	15K ohm	
R259, R260	VRD-ST2EE332J	3.3K ohm	
R261, R262	VRD-ST2EE151J	150 ohm	
R263, R264	VRD-ST2EE105J	1Meg ohm	
R271, R272	VRD-ST2EE563J	56K ohm	
R273, R274	VRD-ST2EE123J	12K ohm	
R275, R276	VRD-ST2EE122J	1.2K ohm	
R277, R278	VRD-ST2EE122J	1.2K ohm	
R279, R280	VRD-ST2EE105J	1Meg ohm	
R281, R282	VRD-ST2EE105J	1Meg ohm	
R291, R292	VRD-ST2EE394J	390K ohm	
R293, R294	VRD-ST2EE104J	100K ohm	
R295, R296	VRD-ST2EE394J	390K ohm	
R297, R298	VRD-ST2EE104J	100K ohm	
R301, R302	VRD-ST2EE155J	1.5Meg ohm	
R303, R304	VRD-ST2EE155J	1.5Meg ohm	
R305, R306	VRD-ST2EE104J	100K ohm	
R307, R308	VRD-ST2EE104J	100K ohm	
R309, R310	VRD-ST2EE274J	270K ohm	
R311, R312	VRD-ST2EE223J	22K ohm	
R313, R314	VRD-ST2EE104J	100K ohm	
R315, R316	VRD-ST2EE102J	1K ohm	
R317, R318	VRD-ST2EE105J	1Meg ohm	
R319, R320	VRD-ST2EE105J	1Meg ohm	
R321, R322	VRG-ST2EA470J	47 ohm, 1/4W, ±5%, Fusible	AB
R323, R324	VRD-ST2EE221J	220 ohm	
R401, R402	VRD-ST2EE334J	330K ohm	
R403, R404	VRD-ST2EE152J	1.5K ohm	
R405, R406	VRD-ST2EE563J	56K ohm	
R407, R408	VRD-ST2EE821J	820 ohm	
R409, R410	VRD-ST2EE821J	820 ohm	
R411, R412	VRD-ST2EE223J	22K ohm	
R413, R414	VRD-ST2EE223J	22K ohm	
R415, R416	VRD-ST2EE152J	1.5K ohm	
R417, R418	VRG-ST2EA101J	100 ohm, 1/4W, ±5%, Fusible	AB
R419, R420	VRG-ST2EA220J	22 ohm, 1/4W, ±5%, Fusible	AB
R421, R422	VRD-ST2EE473J	47K ohm	
R423, R424	VRG-MU2EB681J	680 ohm, 1/4W, ±5%, Fusible	AE
R425, R426	VRD-ST2EE472J	4.7K ohm	
R427, R428	VRD-ST2EE563J	56K ohm	
R429, R430	VRS-PT3DB100K	10 ohm, 2W, ±10%, Metal Oxide Film	
R431, R432	VRS-PT3DB2R2K	2.2 ohm, 2W, ±10%, Metal Oxide Film	
R435, R436	VRG-ST2EA471J	470 ohm, 1/4W, ±5%, Fusible	AB
R501	VRD-ST2EE222J	2.2K ohm	
R502	VRD-ST2EE153J	15K ohm	
R503	VRD-ST2EE223J	22K ohm	
R504	VRD-ST2EE332J	3.3K ohm	
R505	VRD-ST2EE393J	39K ohm	
R506	VRD-ST2EE333J	33K ohm	
R507	VRG-ST2EA101J	100 ohm, 1/4W, ±5%, Fusible	AB
R508	VRD-ST2EE333J	33K ohm	
R509	VRD-ST2EE683J	68K ohm	
R510	VRD-ST2HD332J	3.3K ohm, 1/2W, ±5%, Carbon	
R511	VRD-ST2EE394J	390K ohm	
R512	VRD-ST2EE221J	220 ohm	
R513	VRD-ST2EE820J	82 ohm	
R514	VRD-ST2EE680J	68 ohm	
R515, R516	VRD-ST2EE682J	6.8K ohm	
R601, R602	VRD-ST2EE682J	6.8K ohm	
R603, R604	VRD-ST2EE104J	100K ohm	

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
R605, R606	VRG-ST2EA470J	47 ohm, 1/4W, ±5%, Fusible	AB
R607, R608	VRD-ST2EE563J	56K ohm	
R609, R610	VRD-ST2EE273J	27K ohm	
R611, R612	VRD-ST2EE123J	12K ohm	
R613, R614	VRD-ST2EE392J	3.9K ohm	
R615, R616	VRD-ST2EE123J	12K ohm	
R617, R618	VRD-ST2EE273J	27K ohm	
R619, R620	VRD-ST2EE330J	33 ohm	
R624	VRG-ST2EA271J	270 ohm, 1/4W, ±5%, Fusible	AB
R901, R902	VRS-PT3DB271K	270 ohm, 2W, ±10%, Metal Oxide Film	
R903, R904, R905, R906	VRC-MT2HG153K	15K ohm, 1/2W, ±10%, Carbon Composition	

MISCELLANEOUS

GCAB-3039AFSA	Cabinet	BD
GCOVA1070AFSC	Guide, Lever Switches, Large (SM-4646H)	AD
GCOVA1097AFSA	Guide, Lever Switches, Large (SM-4646HB)	
GCOVA1071AFSC	Guide, Lever Switches, Small (SM-4646H)	AD
GCOVA1098AFSA	Guide, Lever Switches, Small (SM-4646HB)	
GFTAU3058AFZZ	Lid, Bottom	AQ
GLEGP0002SG00	Leg	AD
HPNLC3281AFSA	Panel, Front (SM-4646H)	BE
HPNLC3281AFSB	Panel, Front (SM-4646HB)	
JKNBM0136AFSE	Knob, Muting Switch (SM-4646H)	AC
JKNBM0136AFSD	Knob, Muting Switch (SM-4646HB)	
JKNBN0326AFSA	Knob, Input Level Control/ Input Impedance Selector (SM-4646H)	AH
JKNBN0326AFSB	Knob, Input Level Control/ Input Impedance Selector (SM-4646HB)	
JKNBN0327AFSA	Knob, Volume Control (SM-4646H)	AN
JKNBN0327AFSB	Knob, Volume Control (SM-4646HB)	
JKNBN0330AFSA	Knob, Bass Control/Treble Control/Function Selector/ Speaker Selector/Balance Control (SM-4646H)	AH
JKNBN0330AFSB	Knob, Bass Control/Treble Control/Function Selector/ Speaker Selector/Balance Control (SM-4646HB)	
JKNBP0070AFSA	Knob, Power Switch/Turnover Frequency Selector/Tone Control Defeat Switch/Tape Monitor Switch/Tape Dubbing Switch/Loudness Switch/ High Cut Filter Switch/Low Cut Filter Switch (SM-4646H)	AH
JKNBP0070AFSC	Knob, Power Switch/Turnover Frequency Selector/Tone Control Defeat Switch/Tape Monitor Switch/Tape Dubbing Switch/Loudness Switch/High Cut Filter Switch/Low Cut Filter Switch (SM-4646HB)	
LANGF0374AFZZ	Bracket, Power Amplifier Printed Wiring Board Retaining	AD
LANGQ0515AFSA	Bracket, Rear (SM-4646H)	AS
LANGQ0544AFSA	Bracket, Rear (SM-4646HB)	
LANGR0378AFZZ	Bracket, Controls Retaining	AM
LANGT0451AFZZ	Bracket, Left/Right Hand Sides	AE
LBSHC0002AGZZ	Bushing, Mains Supply Cord	AB
LBSHC0004AGZZ	Bushing, Mains Supply Cord	AC
LBSHC0007AFZZ	Bushing, Mains Supply Cord	AB
LBSHC0056AFZZ	Bushing, Main Chassis	AB
LCHSM0266AFZZ	Main Chassis (See Fig. 26)	
LHLDF1204AFZZ	Wire Holder (See Fig. 26)	AB
LHLDW1052AFZZ	Wire Holder (See Fig. 26)	AA
LHLDW1060AFZZ	Wire Holder (See Fig. 26)	AA
LHLDW9003CEZZ	Wire Holder (See Fig. 26)	AA
LHLDZ8051AFZZ	Holder, Power Source/Circuit Protection Indicator	AB
LX-HZ0053AFFD	Screw, ϕ3 x 8mm, With Washer	
LX-NZ0118AFFD	Nut, Headphone Jack	AA
LX-WZ0019AFFW	Lug Terminal, Earth Terminals	AA
LX-WZ5065AGFE	Lockwasher, Internal Type	AB
PCOVS3054AFZZ	Shield, Tone Control Circuit	AC
PCOVS3061AFZZ	Shield, Input Jacks	AD
PRDAR0101AFFW	Heat Sink, Transistors (Q601 & Q602)	AB
PRDAR0148AFFW	Heat Sink, Integrated Circuits (IC401 & IC402)	BA
PRDAR0149AFFW	Heat Sink, 106 x 330mm	AL
PSHEF0048AG00	Felt, Cabinet	AA
PSHEF0110AFZZ	Felt, Lever Switches	AA
PSPAI0106AFZZ	Fiber, Cabinet	AA
PSPAS0008SGSA	Spacer, Muting Switch (SM-4646H)	AB
PSPAS0008SGSB	Spacer, Muting Switch (SM-4646HB)	AB
QACCB0051AF00	Mains Supply Cord (BEAB)	AN
QACCL4001SE08	Mains Supply Cord (SAA)	AS
QACCN0001AGZZ	Mains Supply Cord (SEMKO)	AQ
QACCS9001SE00	Mains Supply Cord (SEV)	AG
QACCZ0002AG08	Mains Supply Cord	AF
QACCZ0002TAOF	Mains Supply Cord (Audio Photo Club)	AF
QACCZ0052AF00	Mains Supply Cord	AP
F605, F606, F607	QFS-C121CAGNI Fuse, 125mAT	AF

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
F901	QFS-C322CAGNI	Fuse, 3.15AT (240V/220V)	AE
F601, F602, F603, F604	QFS-C402CAGNI	Fuse, 4AT	AE
	QFS-C632DAFNI	Fuse, 6.3A (SEMKO)	
	QFSHD1001AGZZ	Fuse Holder, Printed Wiring Board	AB
	QFSHC0003AGZZ	Fuse Holder, Fuse (F601, F602, F603, F604)	AD
	QFSHP1001AGZZ	Fuse Holder, Fuse (F901)	AH
J901	QJAKJ0057AFZZ	Jack, Headphones	AG
	QLUGL0402AGZZ	Lug Terminal, 4 Terminals	AD
	QLUGP0102AGZZ	Lug Terminal, Printed Wiring Board	AA
	QLUGP0104AGZZ	Lug Terminal, Printed Wiring Board	AA
	QLUGP0111CEFW	Lug Terminal, Printed Wiring Board	AA
	QLUGZ011AAFZZ	Lug Terminal, 4 Terminals Ground	AA
	QLUGZ015AAFZZ	Lug Terminal, 2 Terminals Ground	AA
	QPLGA0201AGZZ	Plug, Mains Supply Cord	AE
	QPLGA0205AGZZ	Plug, Mains Supply Cord	AK
	QPLGZ0150AFZZ	Connection Pin	AB
	QPWBF0353AFZZ	Printed Wiring Board, TAPE-1/TAPE-2	
	QPWBF0572AFZZ	Printed Wiring Board, Power Amp.	
	QPWBF0573AFZZ	Printed Wiring Board, Input Jacks	
	QPWBF0438AFZZ	Printed Wiring Board, Equalizer/Tone Circuit	
SO906	QSOCE0554AFZZ	Mains Voltage Selector	AK
SO903 (A–D)	QSOCZ2472AFZZ	Socket Assembly, AUX/TUNER	AH
SO904 (A–D)	QSOCZ2472AFZZ	Socket Assembly, PHONO-1/ PHONO-2	AH
SO901 (A–E)	QSOCZ2450AFZZ	Socket Assembly, TAPE-1	AK
SO902 (A–E)	QSOCZ2450AFZZ	Socket Assembly, TAPE-2	AK
SO905 (A–D)	QSOCJ2459AFZZ	Socket Assembly, PRE/MAIN CONNECTION	AE
SW207 (A, B)	QSW-B0051AFZZ	Switch, Tone Control Defeat	AK
SW301 (A–D)	QSW-B0053AFZZ	Switch, Low Cut Filter	AL
SW201 (A, B)	QSW-B0054AFZZ	Switch, Tape Dubbing	AL
SW206 (A–D)	QSW-B0063AFZZ	Switch, Turnover Frequency Selector for Bass Control	AH
SW208 (A–D)	QSW-B0063AFZZ	Switch, Turnover Frequency Selector for Treble Control	AH
SW205 (A, B)	QSW-B0064AFZZ	Switch, Loudness	AH
SW302 (A, B)	QSW-B0064AFZZ	Switch, High Cut Filter	AH
SW202	QSW-B0073AFZZ	Switch, Tape Monitor	AH
SW901	QSW-B9059AFZZ	Switch, Power	AQ
SW204 (A, B)	QSW-P0139AFZZ	Switch, Muting	AG
SW203	QSW-R0101AFZZ	Switch, Mode Selector	AN
SW902 (A, B)	QSW-R0116AFZZ	Switch, Speakers Selector	AR
SW101 (A, B)	QSW-R0135AFZZ	Switch, Function Selector	AV
SW102	QSW-R0136AFZZ	Switch, Input Impedance Selector	AQ
TE901, TE902	QTANN0150AFZZ	Terminal, Earth	AD
TE903	QTANZ0454AFZZ	Terminal Assembly, SPEAKERS-A	AG
TE904	QTANZ0454AFZZ	Terminal Assembly, SPEAKERS-B	AG
RLY501	RRLYZ0052AFZZ	Relay, Circuit Protection	AU
	SPAKA0447AFZZ	Cushion, Paking, Right Hand Side	AH
	SPAKA0456AFZZ	Cushion, Paking, Left Hand Side	AH
	SPAKC0999AFZZ	Individual Carton (SM-4646H)	AQ
	SPAKC1055AFZZ	Individual Carton (SM-4646HB)	
	SPAKF0002AGZZ	Cardboard, Mains Supply Cord	AA
	SSAKA0007SEZZ	Sack, Operation Manual	AA
	SSAKA0023AGZZ	Sack, Unit	AC
	TCAUA0172AFZZ	Caution Sheet, Fuse (6.3A)	
	TCAUA0189AFZZ	Caution Sheet, Fuse (3.15AT)	
	TCAUH0053AGZZ	Caution Sheet, For Users in UK	
	TCAUS0052AFZZ	Caution Label, Cabinet (Europe)	
	TCAUS0076AFZZ	Caution Label, Cabinet (Australia)	
	TCAUZ0039AFZZ	Caution Label, Sack (UK)	
	TGANE1010AGZZ	Warranty Card, For Users in UK	
	TGANE1103AFZZ	Warranty Card, For Users in Audio Photo Club	
	TGANE1114AFZZ	Warranty Card, For Users in Australia	
	TGANG1039AFZZ	Warranty Card, For Users in Europe	
	TINSL0102AFZZ	Operation Manual	AT
	TLABJ0006AFZZ	Label, Made in Japan	
	TLABP0128AFZZ	Label, 4.0AT	
	TLABP0133AFZZ	Label, 125mAT	
	TLABS0004AGZZ	Label, SEV	
	TLABS0016AGZZ	Label, SEMKO/NEMKO	
	TLABS0054AFZZ	Label, BEAB	
	TLABS0062AFZZ	Label, Ground	
	TLABS0063AFZZ	Label, DEMKO	
	TLSTS0001ZZRO	Service Station List (SCA)	
	TLSTS0051AFZZ	Service Station List (SEC)	
	TMAPC0428AFZZ	Schematic Diagram	
	TTAG-0037AGZZ	Tag, Mains Supply Cord	AC
	TTAGH0008AFZZ	Tag, English/German/French	

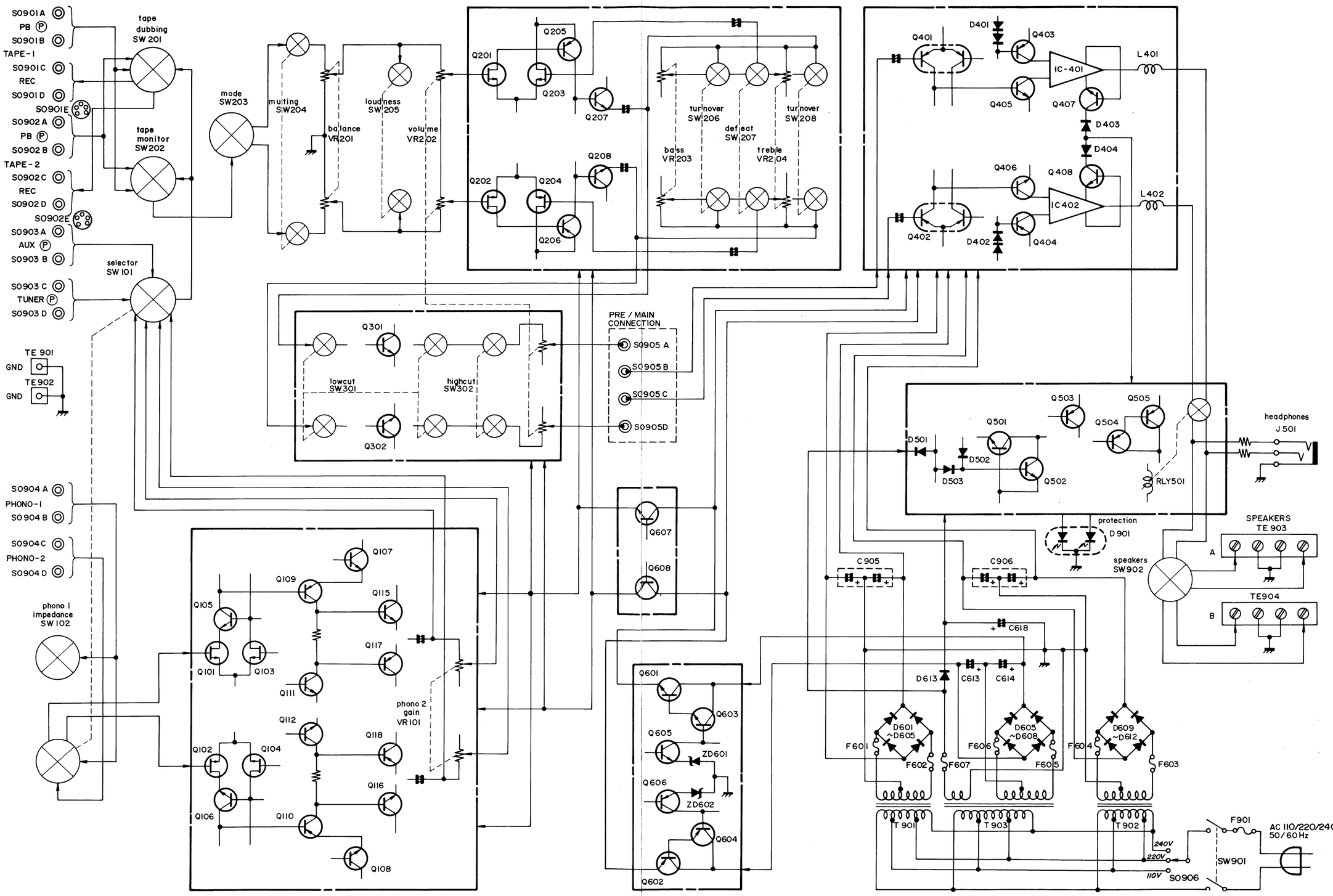


Figure 27 BLOCK DIAGRAM

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